Smithsonian

May 1988

In space, Gemini astronaut Michael Collins takes a walk on the wild side (p. 42)

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May 1988

Smithsonian

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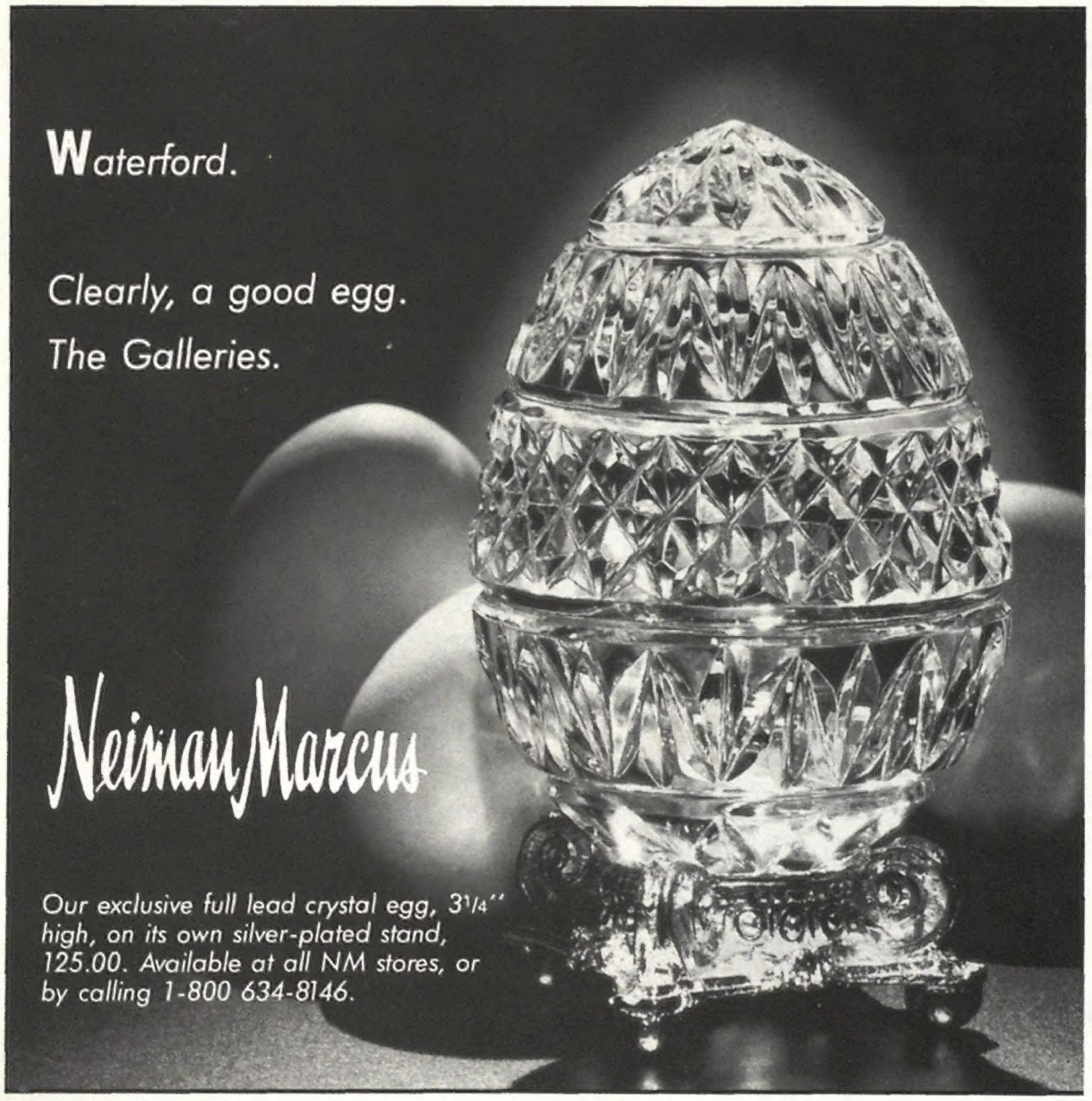
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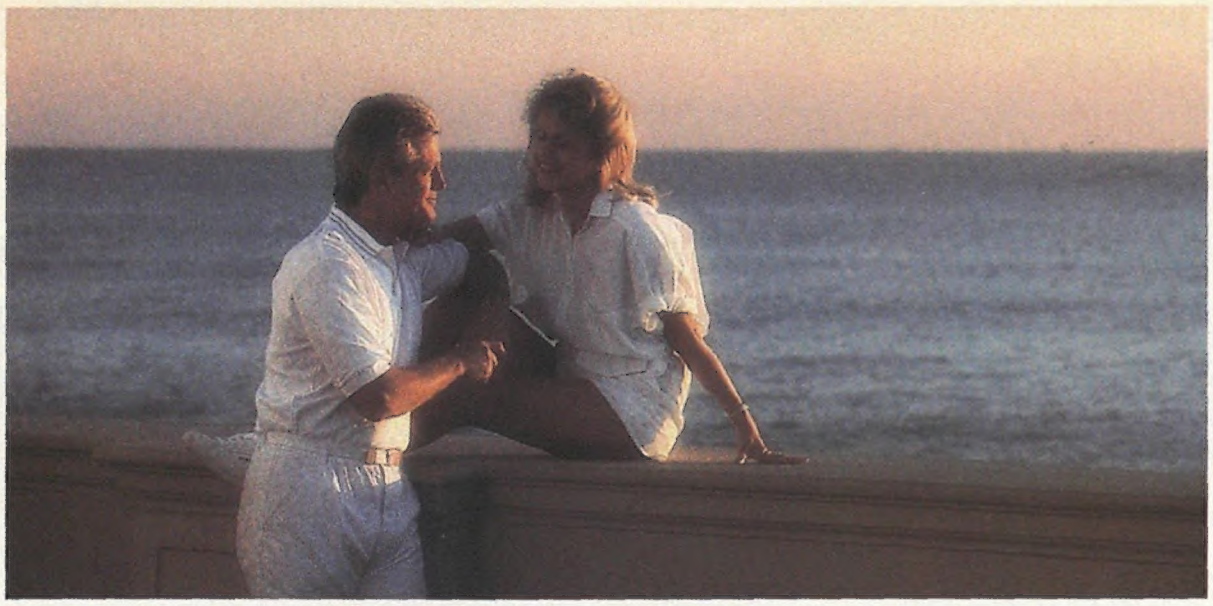

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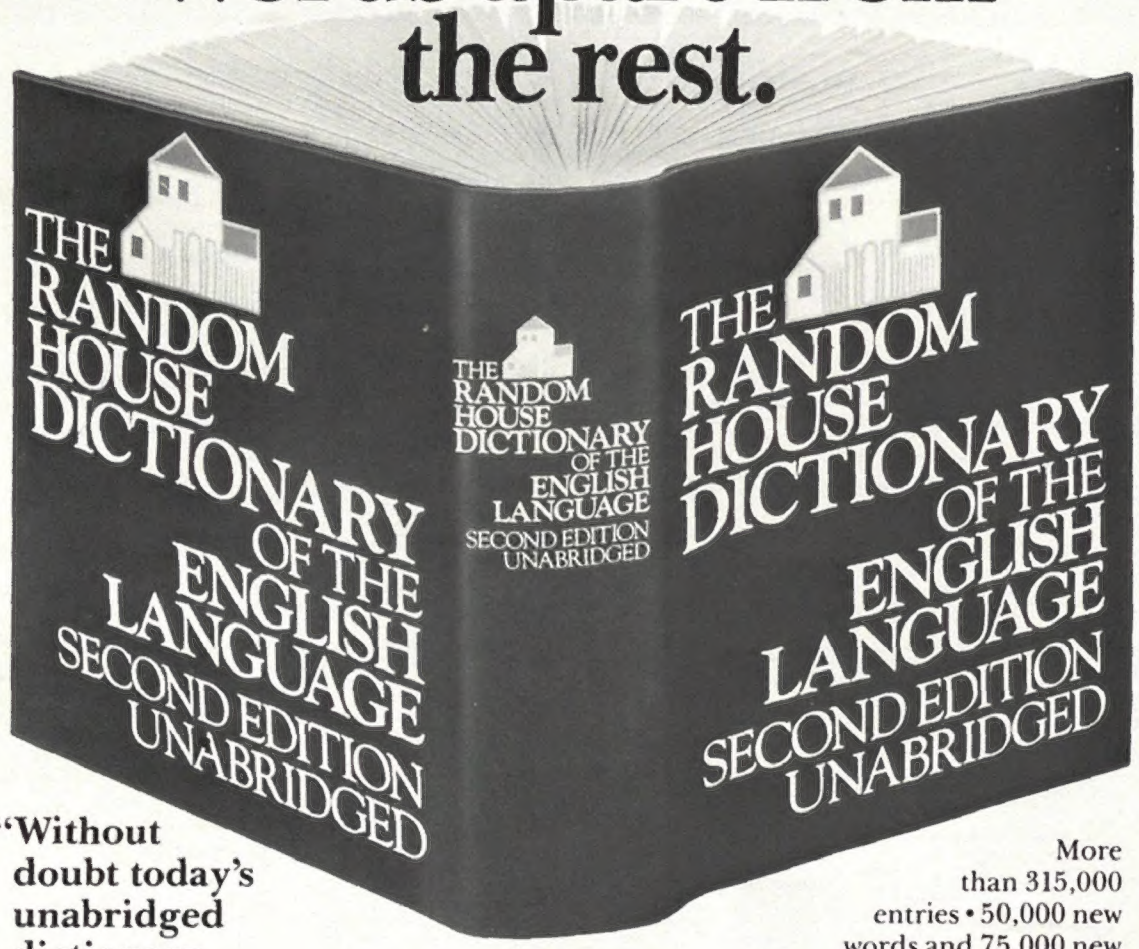
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Secretary Adams' comments

Smithsonian horizons

Public opinion sampling will assist the Smithsonian in evaluating the impact of our exhibits and programs

Opinion surveys, having become almost inescapable in the daily flow of news, assume again this year their special, quadrennial prominence. The public attitudes registered in the surveys, not only toward the candidates but toward an enormous range of issues, play a decisive part in shaping political strategies. Yet while the 50th-anniversary issue of *Public Opinion Quarterly* testifies eloquently to its coming of age, the scientific measurement of public opinion still faces a host of challenges.

Pols and polls may seem to have a natural affinity, but it is of relatively recent origin. Barely half a century ago, as Philip Converse observes, public opinion was not a matter of giving a sample of unrelated people in all walks of life an equal weight, but of highlighting the views held by notables who presumably spoke for the organizations or interest groups they headed. The newer, statistical rather than hierarchical, approach probably reflects our underlying drift in a "populist" if not egalitarian direction. But what the *Quarterly* calls the "triumph of the quantitative" has accomplished something equally important: not necessarily an improvement in the margin of error over that of an astute observer without recourse to sampling, but the substitution of calculable levels of error for previous ones that were essentially unmeasurable.

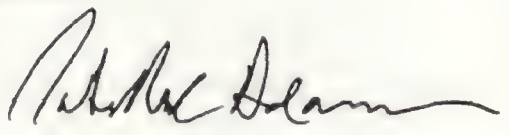
This is the good news, but there is also "plenty of bad." Newsworthiness usually takes precedence over quality, with the public given few clues by which to make the distinction. There are some reports that public cooperation is declining. Accuracy will be the likely victim of falling response rates, which are rarely referred to in any but the more academic accounts. At the outer fringe of such troubles are puzzling inconsistencies supporting suspicions that the public harbors dark undercurrents of Ludditism (resentment of technological progress and invention).

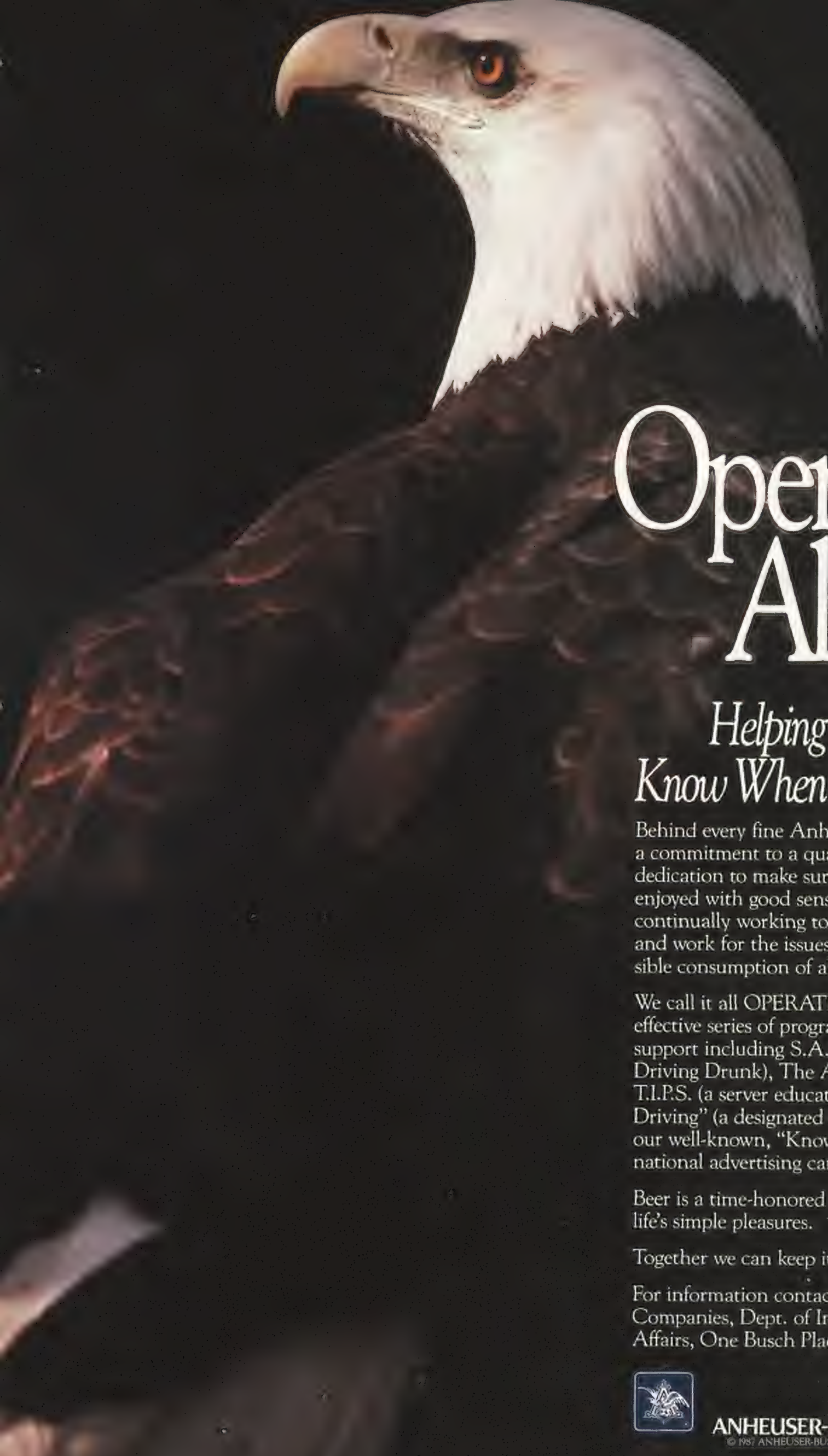
Converse notes that there is always a tension between opinion measurement, no matter how accurate, and actual political outcomes. By grouping replies into categories, we may create the illusion that opinions divide themselves into homogeneous, monolithic blocs. The very success of polls begets an unreasoning faith in the accuracy of their results. Respondents, reading of profuse findings, may be more inclined to base their answers—but not necessarily their voting or other behavior—on what they reckon to be socially acceptable. As measures of opinion become weightier and more all-encompassing, this tendency to define an acceptable range of values creates the potential for a silent majority that shares them only in part—or not at all. And in any case, as James Davis dryly suggests, pollsters rarely can take time to explore in depth what people have in mind in response to questions dealing with "Communism" or "happiness" or "performance on domestic issues."

Since campaigns are designed to persuade people, there is a deeper question here as to the efficacy of mass communications. Elihu Katz is unequivocal: "In spite of the blind belief of advertisers, politicians, some academics, and the public that media campaigns are capable of inducing massive change in opinions, attitudes, and actions—always somebody else's, not one's own—the research evidence continues to say otherwise."

It is probably just as well that media campaigns are not very successful in telling us what to think or do. Alternatively and more persuasively, Katz suggests, they may tell us what to think *about*. By preempting attention, they can frame choices in such a way as almost to exclude certain issues or candidates from consideration.

Although not with the intention of persuading anybody of anything, the Smithsonian has taken a first, long step toward developing its own experimental research capability. Specialist Zahava Doering has begun to collect high-quality survey data that can help us to recognize the characteristics of our audience. With its aid we will be able to assess more adequately the impacts of our exhibits and outreach programs, reshaping them better to fulfill their educational purposes. Who comes to museums and why, and what do people take away with them? Needless to say, we will not be looking for monolithic answers. Indeed, our major objective may be to sensitize ourselves more effectively to America's astonishing diversity in every cultural dimension imaginable.





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Letters to the Editor

Marine plastic pollution

Dear Sir: How fitting and proper, in your March issue, is the juxtaposition of the article on the modern world's drowning in plastics with Hieronymus Bosch's portrayal of its apocalypse a half-millennium ago.
J.C. Owen
McLean, Virginia

Dear Sir: While a graduate student in marine biology, I participated in the post-rescue care of a pygmy sperm whale and her calf. As many stranded marine mammals do, the mother died in captivity but the calf held on. It was very exciting to watch this young animal swim so freely and feed readily on the squid offered by hand. Suddenly the calf died, and I attended the necropsy. This beautiful animal, seldom seen in captivity, had in its small stomach a plastic bread wrapper, a corn-chip bag and a large trash bag. It was heartbreaking and senseless to those of us who had spent long, cold hours in the water caring for the calf.

The dangers of plastic waste products in the marine environment were vividly seen. Airing such tragedies may save other animals from a similar fate.
Stacy Jones
San Antonio

Dear Sir: The cost of cleanup of plastics from the ocean should be imposed on the plastics industry worldwide.
Dinesh Chandra
Deltona, Florida

Blizzards of '88

Dear Sir: My grandfather, a dealer in teas and coffees as well as staple and

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fancy groceries, had a store on the corner of Monroe and Gouvernour streets on Manhattan's Lower East Side. Shortly before the blizzard hit, he purchased an inordinate amount of tea—over the strenuous objections of my frugal little grandmother—in order to obtain an imported music box as a bonus.

My father, who worked with his father and recalled the blizzard vividly, told of people digging tunnels under and through the snow in order to get to their store. Not only did they sell all the tea, but also all the staple and fancy groceries, some of which had been in stock for years. Within a few days all the shelves were bare.

Frederick H. Jaeger
Toms River, New Jersey

Dear Sir: In 1888, my dad was a 9-year-old emigrant from Norway, living in a sod house about 40 miles north of Huron in Dakota Territory. He later wrote this vivid description of the storm and its effects:

"There was an ominous feeling in the air, such as one experiences before a rain storm. Soon a white cloud crept over the northern horizon and in a short time the entire firmament was covered with snow which was moving at the rate of an express train. . . .Visibility was zero, and the wind whipped the snow into such a fine dust that a person would choke in a few minutes. . . .One man was caught in the storm while he was driving cattle to the river. When it struck, he happened to have a large knife, so he killed a big ox, gutted it, and crawled inside. By morning, the flesh and hide was frozen and he could not get out until help came."

Roger H. Olson
Boulder, Colorado

Newberry Library

Dear Sir: The caption for Joel Freid's photograph on page 124 says the book partially visible at the top is *The Game and Playe of Chesse.* The left-hand page seems to describe a picture of linen merchants and money changers. The right-hand side quotes Seneca on the topic of the avaricious who, like the wolf, is good only after death.

How does this tie in to chess?

Alice C. Grover
Southbury, Connecticut

Jacobus de Cessolis' The Game and Playe of Chesse *has little to do with the rules of the game and does not discuss how the pieces are moved. It is an alle-*

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THE CORDON BLEU PORCELAIN MOULD COLLECTION

gory about the stations of humankind, using the chessboard and its pieces as metaphors to show how persons of different rank should behave. Ed.

Lindow Man

Dear Sir: Due, I am sure, to a lack of golden sickles, persons who harvest mistletoe here in Willamette Valley in western Oregon commonly use shotguns. There is much heated argument as to appropriate gauge, shot size and choke. In some localities, those who hunt mistletoe with a 12-gauge are shunned for life; just isn't done, y'know.

There is, however, nearly unanimous agreement as to the most productive habitat: old oak trees. This is contrary to what Robert Wernick tells us. May we have a clarification of this point?
Peter Neketin
Hillsboro
*Apple and poplar are hospitable hosts for most European true mistletoe (*Viscum *sp.) but in a few areas it does appear on oak. In the United States the primary host for American true mistletoe (*Poradendron *sp.) is indeed the oak.* Ed.

Dear Sir: The best-preserved Bog People have been found in Denmark. Researchers Ross and Robins' theory does not draw on all that is known about them—the famous Tollund Man of Jutland or Grauballe Man, or Borre Fen Man with the same garrote around his neck. Or any other of a number of men and women found in Scandinavian bogs in similar condition, with ropes, neck-halters, skull fractures, and in several instances with the same seed-cake stomach contents.

The excellent study by Professor P. V. Glob of Copenhagen, *The Bog People*, suggests that these Iron Age human sacrifices were made to the Germanic fertility goddess Nerthus and that the victim, usually of the same physical appearance and condition as Lindow Man, represented her spouse sacrificed during a spring ceremony after a year's preparation.
Jan-Maarten Zegers
Bethesda, Maryland

Dear Sir: Robert Wernick too glibly defines and dismisses the Reformed Druids of North America, founded in 1963 by students at Carleton College to satirize and protest the requirement that all students attend religious services at least once a week. The name seems to have been chosen mostly for its humor. At a time when many students were questioning their commitments to mainstream religions, the RDNA offered a venue in which traditions and creeds from Hinduism and Judaism, Christianity and paganism could be separated, questioned, compared and merged.

Reformed Druidism vowed never to proclaim answers, only to encourage questions. Truly a 1960s phenomenon.
Mark A. Greene, Archivist
Carleton College
Northfield, Minnesota

School for butlers

Dear Sir: We seem to have a contradiction between the text on page 110 and the picture on page 111. Text: ". . . please note that my thumbs are kept below the tray, not lapping over the top. We do not show thumbs."

The picture shows THUMBS. Frankly, I would consider it difficult to carry

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Mick Jagger

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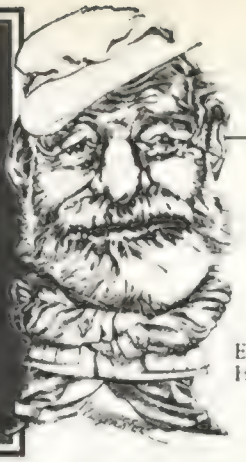
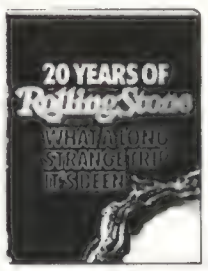
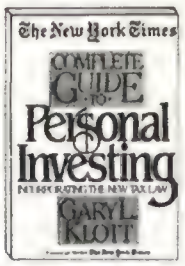
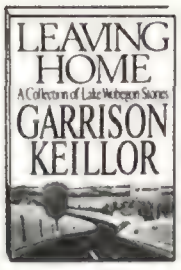

Ernest Hemingway



*716. From the pages of *Rolling Stone*, a documentary of the past 20 years. 200 photographs.
Hardcover: $24.95
QPB: $12.95



*754. This comprehensive guide offers expert advice on financial planning.
Hardcover: $22.50
QPB: $11.50



*402. From the author of *Lake Wobegon Days.*
Hardcover: $18.95
QPB: $8.95

347. Practical tips on how to renovate a house on a limited budget.
Hardcover: $22.50
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*790. A famous romance novelist is imprisoned by a psychotic ex-nurse.
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414. Over 600 of Larson's quirky creations and most bizarre cartoons.
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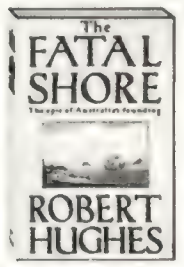

477. The dramatic saga of the founding of Australia.
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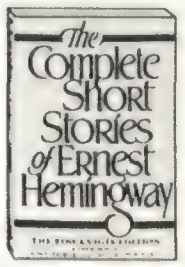

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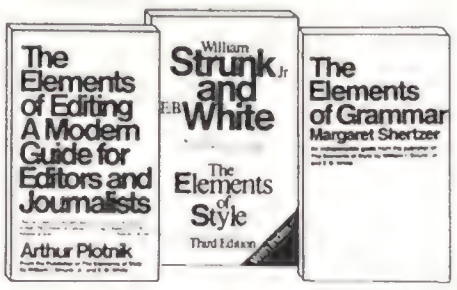

109. A special QPB trio: *The Elements of Style, The Elements of Grammar* and *The Elements of Editing.*
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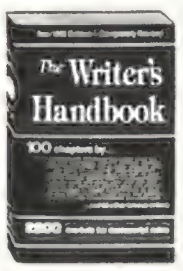
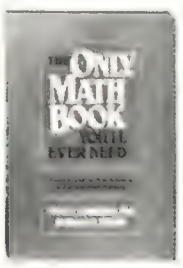
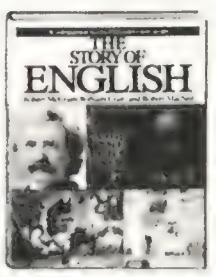


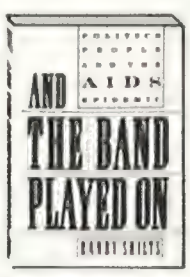
*199. New 1988 edition. What to write, how to write it, how to sell it.
Hardcover: $26.95
QPB: $12.95



*739. Survival guide for when you run out of fingers.
Hardcover: $17.95
QPB: $8.95



721. From the PBS series on the evolution of the English language.
Hardcover: $24.95
QPB: $12.95



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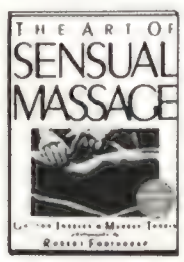

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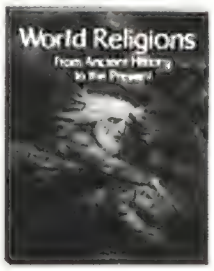

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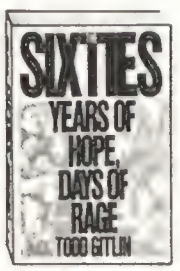

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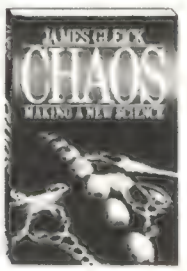

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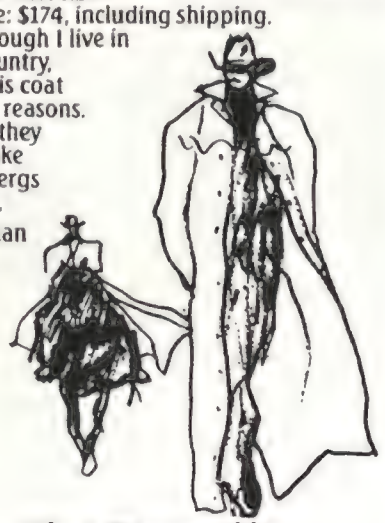
J. Peterman



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a tray without thumbs lapping over.
Vince Gaffney
Duluth

Ivor Spenser says he meant thumbs should not extend into *the tray. For the photographer, he demonstrated the proper tray-holding technique.* Ed.

Dear Sir: Richard Wolkomir's article seems to suggest that Jeeves, once the exemplar of personal service and loyalty, has become little more than a job-hopping bureaucrat. Pity. Soon, I fear, we shall lose sight altogether of the time when a faithful manservant [below] would leap at almost any opportunity to serve the master.
J. McEvoy
Evanston, Illinois

"I'm ruined Jeeves. Be a good chap and jump"

Dear Sir: P.G. Wodehouse's Jeeves is not a butler. He is a gentleman's personal gentleman—more vulgarly, a valet. True, on rare occasions Jeeves has functioned as a butler, subject to the exigencies of Wodehouse's plots. Wodehouse's butler is exemplified in Beach.

The caption on page 121, referring to two aspiring butlers as "gentlemen's gentlemen," is also in error.
Stuart MacClintock
Silver Spring, Maryland

Country Western shrines

Dear Sir: Shrines indeed! How about the hefty admission to all of these superstars' money-grubbing holy spots? If they truly "loved" their fans they wouldn't extort those on pilgrimages to the hallowed ground. They've made their mil-

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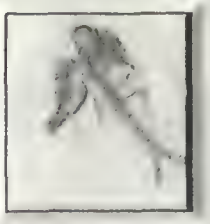

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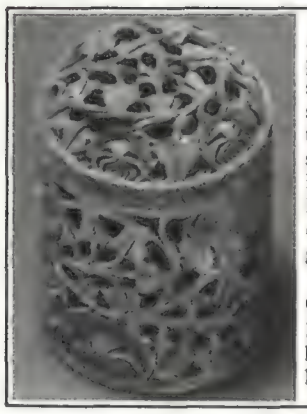

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lions, so spare me Barbara Mandrell's cloying sweetness, Minnie Pearl's overpriced aprons and hats. This Nashville is a rip-off!
Robert G. Esh
Prescott, Michigan

Dear Sir: Mr. Gates mentions a 1959 Dodge Charger from the *Dukes of Hazzard* TV series. The cars used as Beau and Luke Duke's General Lee were 1968, '69 and occasionally '70s.
Brian Jopek
Iola, Kansas
Mr. Jopek is correct. Ed.

Domunyms

Dear Sir: May I offer Paul Dickson two alternatives to his cleverly concocted word "domunym." One could say "urbanym" (from the Latin *urbs* for city) and "locunym" (from *locus*, for place). Then, one could really claim "There's no locunym like homonym!"
Monique M. Byer
Springfield, Virginia

Dear Sir: Some years ago a feisty lady, the widow of a Princeton professor, delighted in telling friends that, while en route to their wedding, her fiancé announced to colleagues: "This Michigander is off to fetch his Michigoose."
Julia Darby
San Francisco

Dear Sir: Paul Dickson advises "just ask an . . . Afghani" about the likelihood of Eastern peoples adding an *i* to their national name. If you do, you probably won't get much of an answer. Afghani is the currency used in Afghanistan. A citizen of the country is an Afghan.
William Robichaud
Madison, Wisconsin
The new Random House dictionary gives Afghani, but as second choice. Ed.

Dear Sir: Paul Dickson left out the domunym for the true Down Easters, long known as Maineiacs (especially to their neighboring New Englanders). Most Maineiacs accept this moniker amiably, but some stuffy ones prefer to be called Mainers.
Edna M. DuBuis
Santa Barbara, California

Dear Sir: By far the most common term used to describe residents of Connecticut is "Commuters."
Allan D. Pratt
New Haven

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Around the Mall and beyond

Those who visited the Museum of American History last winter may have noticed an unpretentious cabinet set in one of the central hallways. In it were displayed a number of small, offbeat items. I remember particularly a dainty, round basket made entirely of pine needles. I didn't know you could make much of anything out of pine needles, but, according to Theresa Singleton, years ago in North Carolina an old black woman wove together these dark brown needles from a Southern pine to form this basket. She made a lid, too, and adorned it with pine-needle rosettes. "I think it's one of our best things," says Theresa.

Singleton directs a long-planned Smithsonian project to record all Afro-American artifacts in our museums. Thanks to the swelling memory banks of the Institution's growing army of computers, the program is well under way. It's due to finish in August.

Theresa tells me that we have more black-American acquisitions than any other museum, but that our collections are somewhat uneven. "We're good on collections dealing with the civil rights movement, sports and entertainment, and we're strong on crafts from the Sea Islands, off the Georgia-South Carolina coast. But there are some areas that have little or no representation, and we've got much more, hidden away somewhere, that we're trying to uncover." How many items? The official estimate is 30,000. Theresa thinks that's high. "Somewhere between 10,000 and 20,000 is probably more realistic."

The Afro-American Index Project began in 1985 as a shared venture of the Anacostia Museum and the Museum of American History. Now Theresa and her staff have been probing three other

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museums—Natural History, Air and Space and the National Portrait Gallery. Natural History's artifacts, mostly from the Caribbean, were gathered at least half a century ago for its anthropologists. Black art is well documented at the Portrait Gallery. And an exhibit of blacks in aviation continues at NASM.

Theresa's own museum, American History, had no early policy of recording the race of a donor. "I have to rely on my own experience," she says. She'd like to beef up the collection with more material from today's black Americans. With luck, she might find a few things to match the pine-needle basket and the other unique articles that went into that temporary display case.

There was a horse collar, for example, made of corn husks, perhaps simply for the sake of decoration. As though to go with it, there was a patent model for a corn sheller—a sharpened iron hook set into a wooden handle. The hook's inside diameter varies, so any ear of corn would fit against the sharp inside edge. Then you could rip away the kernels. There was a solid wooden bowl, gouged from a slab of tupelo gum, "probably to serve as a bread tray," Singleton believes. A neat little drill that spun as you moved its handle up and down was used to bore screw holes in red-hot metal. You could use this "pump drill" with only one hand.

Blacks produced these objects, adapting pine needles, corn husks, fallen trees, scrap iron—using their ingenuity to make their work a little easier. The artifacts on exhibit give you a glimpse of life's bitter edge.

Theresa Singleton says our earliest Afro-American collections go back to international fairs put on in the postbellum South. The New Orleans Cotton Exposition opened in 1885 to show the world that the former Confederacy was recovering from defeat, that in the "New South," blacks and whites were getting along together just fine. Of course, the black displays were carefully segregated as ethnic examples, along with articles from Indians and certain immigrants.

The Smithsonian had a representative at the New Orleans fair: Solomon G. Brown. He was the first black employee, an extraordinary staff member who helped shape the Institution's character and destiny. "I have a hunch," says Singleton, "that Brown had a good deal to do with our getting what black-American artifacts we acquired during his tenure."

On the strength of that, I found my way to the Smithsonian Archives (no mean task) and dug through old papers to unearth a little of Brown's story.

Born free in what was then slave-holding "Washington City," Solomon was left fatherless at age 4, homeless at 5 (the family home was seized in payment of alleged debts) and lacking in education until he scrabbled it for himself. He was apparently apprenticed to the city's assistant postmaster, Lambert Tree, a decent and trustworthy man who wangled a post office job for the teenage black and later attested, as was the procedure in slave days, that no one had a claim on Brown's freedom.

One of young Solomon's earliest post office duties was to help set up the first telegraph line between Washington and Baltimore. In 1844 he reported for work to Samuel F. B. Morse and there met one of Morse's associates, a famous physical

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scientist from Princeton named Joseph Henry. Professor Henry had not yet been appointed Secretary of the Smithsonian. In fact, Congress had not yet officially established the controversial institution called for in the will of the eccentric Englishman James Smithson.

In an article he wrote for some schoolchildren late in his life, Brown reminisced that he had carried the first telegram to an American President, delivering it to James Polk's White House. He also developed a fascination for the physics involved in Morse's invention. This interest expanded to other areas of science. When his job with Morse was over, Brown went to work for a chemical company. In 1852, Joseph Henry offered him $24 a month (not too bad, back then) for "services" at the Smithsonian. The Castle wasn't yet finished.

Records show that in 1864 Brown was a "museum assistant," paid $60 a month. He catalogued and stored animal specimens, and was soon preparing illustrations for use in natural history lectures. Before long he himself was lecturing on insects, geology, embryo plants, minerals.

He also took a leading role in Washington's civic organizations. For a man with no formal schooling he held a surprising post in higher education—trustee of Ohio's Wilberforce University, founded for blacks in 1856. In 1871 he was elected to the House of Delegates of the newly formed territorial government of the District of Columbia. All the while, he remained on the Smithsonian staff.

In 1885, Solomon Brown was named alternate commissioner for the "colored exhibit" at the New Orleans exposition. A note to Brown from Spencer Baird, the second Smithsonian Secretary, mentions the appointment and adds that "you will have no difficulty in fulfilling its duties."

Theresa Singleton suspects that Brown played an important role in our acquiring as many artifacts as we did from that exposition. "The Smithsonian was much smaller back then," she told me. "Everyone knew everyone else. Brown was no common laborer. He was a smart man and he had helped Dr. Henry from the beginning."

The Smithsonian apparently kept an eye on subsequent Southern fairs, all with black displays. Atlanta's, in 1895, had a "Negro Building," specially built by blacks. Others followed in Nashville, in Charleston and to mark Jamestown's 1907 Tercentennial. Black exhibits at that Virginia fair totaled nearly 10,000. Singleton's eyes gleam at the thought.

By the last decade of the 19th century, Solomon Brown was writing bits of poetry: "What is time that man should give/ Such ever earnest heed?/ Why can't we use it while we live—/ To suit our wants and need?. . ." In the Archives, there is an 1889 letter from Brown presenting his supervisor, William J. Rhees, with a copy of one of Brown's annual "letters to Children," which had "reached a gentleman in Portsmouth Va, (unknown to me) who set it to Music. . . ." Brown appreciated this; he himself was the author of several hymns for a church he served well. In fact, four of his hymns were published in the 1904 official hymnal of the Colored Methodist Episcopal Church.

He lived in Anacostia, just across the Anacostia River from the Capitol. His home was on Elvans Avenue (now Road), about seven blocks southwest of

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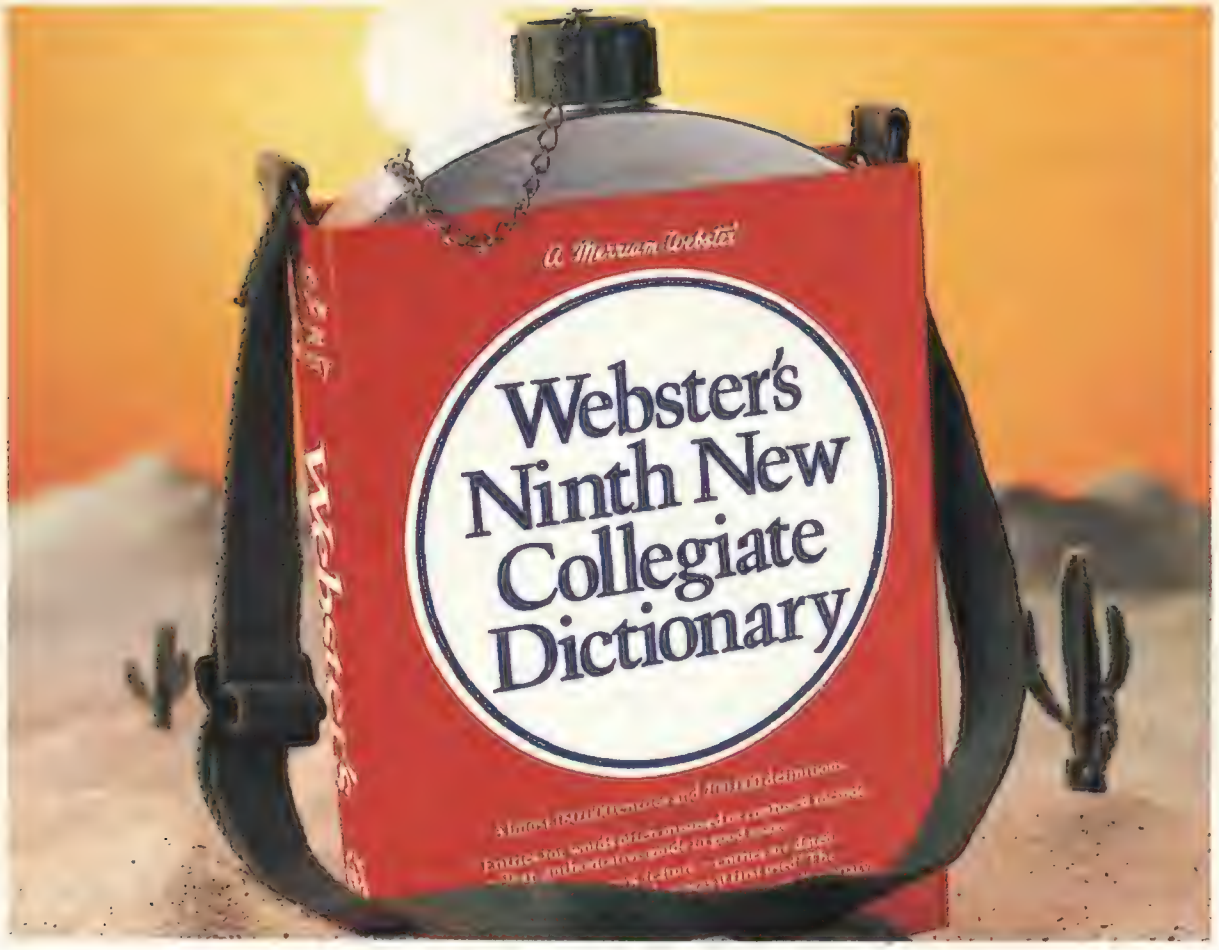

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Solomon Brown, man of many talents, was at Smithsonian from 1852-1906.

where the Smithsonian's Anacostia Museum now stands.

It was there that Brown died at age 77, soon after his retirement in 1906. He had served three Secretaries—Henry, Baird and Langley. I'll never be able to follow the progress of Theresa Singleton's Afro-American Index Project without a silent nod toward Solomon Brown. He came to the Castle with nothing. Within its walls, he grew to a remarkable stature and I hope he still haunts the old place.

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Phenomena, comment and notes

The Gaia hypothesis—that life creates the conditions it needs—has its days in court; the jury is out

Jim Lovelock worried out loud that he had been on trial all week for the scientific equivalent of the British offense of "wasting police time." Had he been wasting the time of the 160 people who had come to San Diego, scientists who "have better things to do than expose my scam"?

The American Geophysical Union, with some trepidation, had convened the conference to discuss Lovelock's Gaia hypothesis, the idea that the living things of Earth create the environmental conditions they need. When he began his work on Gaia 15 years ago, Lovelock said, he secretly hoped to be condemned by the theologians. Instead he was condemned by the biologists and invited to preach at the Cathedral of St. John the Divine.

The most provocative way to state his thesis, Lovelock said, is: "The Earth is alive." The idea is not original with him. The Scottish geologist James Hutton wrote in 1785: "I think the Earth is a superorganism." According to Lovelock, the Earth *is* a superorganism in the sense that it regulates itself much as a body does to maintain a constant temperature. The Earth keeps any number of environmental factors nearly constant, including a steady proportion of a highly reactive gas—oxygen—in the atmosphere. Oxygen appeared two billion years ago when plants capable of photosynthesis first evolved. It was a deadly poison for the anaerobes (organisms that can function only in the absence of oxygen) that already lived on

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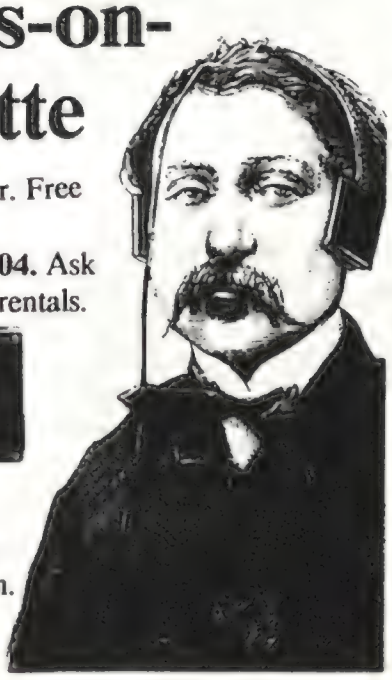

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the planet, but the breath of life for the new organisms to follow.

Lynn Margulis, a Boston University biologist who has frequently been Lovelock's coauthor, said Lovelock had pointed out 25 years ago that the existence of life on Earth could be detected from far away in space mainly by that oxygen in the atmosphere. In addition, there are many millions of times too much methane—the product of large animals as well as swamps and rice paddies—for there not to be life. And our atmosphere also has "large particulates," combinations of potassium, phosphorus and calcium, moving rapidly through it, Margulis said—we call them sea gulls.

Life affects the physical Earth in many ways, some not obvious. Walter Shearer of the United Nations University in Tokyo had some examples that were news to me. The 100 trillion ants in the Amazon add something like 55,000 tons of formic acid a year to their environment, which may account for a quarter of the acidity of the rain there. Or take the innocuous-looking fungi that grow on rotting trees: they produce five million tons of chlorocarbons a year, injecting them into the atmosphere as they explosively release their spores.

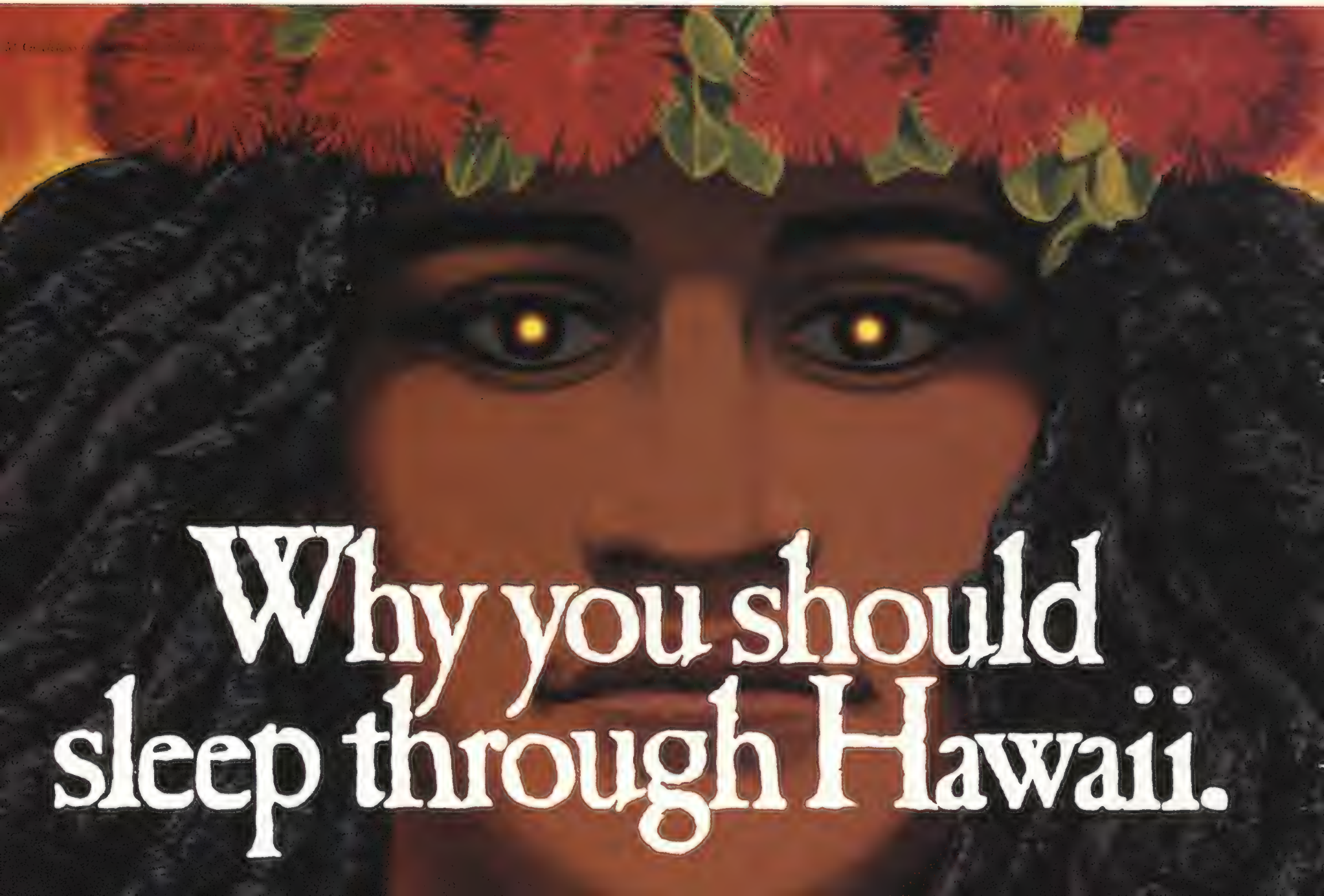
It was clear that no one was questioning the "weak" version of the Gaia hypothesis: that life has a tremendous impact on the physical environment. The fight centered around the "strong" version: that life works to make the environment more hospitable. Paul Ehrlich of Stanford argued that this is not true on any time scale. When immediate, short-term conditions are good, he said, butterfly larvae will completely defoliate their host plants. On longer time scales, he said, "I find it hard to believe the planet is evolving to make things comfortable for life. If we were all anaerobes sitting here, having to live in a termite's gut, we would not be so happy about it."

Speaking to Gaia proponents, he continued: "In the scientific community, you will be damaged to the degree you push the superorganism metaphor."

Damaging or not, a number of speakers alluded to the long history of the idea, to T. H. Huxley's "physiography," Herbert Spencer's "progressive development," to Alfred Lotka's 1925 statement: "It is not so much the species or the organism that evolves, but the entire system, species and environment. The two are inseparable."

The idea of an anima mundi, a world soul, is enormously attractive to some people. Those who care passionately about the natural world instinctively embrace Gaia. But so do the bad guys. John Visvader of the College of the Atlantic pointed out that the concept of a world that keeps itself running with a system of mechanical feedback loops is very attractive to polluting industries. If Gaia regulates and stabilizes the environment no matter what happens, then life will go on no matter what we do. The same theory that persuades the ecofundamentalists that we need to care more for the Earth persuades polluters that we need to care less.

Lovelock himself is not one bit sentimental about his goddess. "Gaia is no doting mother," he said, "no fainting damsel. She is a tough virgin, 3.5 billion years old. If a species screws up, she eliminates it with all the feeling of the microbrain in an ICBM."



Ecofundamentalists are not a new phenomenon. Stoic philosophers down to the 15th century discouraged mining as being traumatic to Mother Earth. Metallurgy was compared to obstetrics. Some people today, apparently, believe Gaia caused the 1985 Mexico earthquake because she was angry about mining (Lovelock laughed out loud at the mention of this).

Ostensibly the meeting was called to see if there are ways to test the Gaia hypothesis. By design, however, there was no concluding session to sum up and list the results. The very definition of Gaia resisted formalization, shimmering in the California air but never taking solid shape. Lovelock said at the last-night banquet that someone had slipped a handwritten note under his door urging that he not define Gaia but let everyone at the meeting try it.

The harshest words came at the Tuesday night epistemology session. James W. Kirchner of the University of California, Berkeley, offered a taxonomy of six levels of Gaia hypothesis ranging from weak to strong. He called the strong version an untestable hypothesis, something much worse, he said, than a merely false hypothesis.

The purpose of Gaia has never been defined, he said. What is good for one organism is not good for another. If we attribute to Gaia the most destabilizing event in the history of the planet—the switch from a reducing to an oxidizing atmosphere two billion years ago—then how can we now attribute a stabilizing influence to that same Gaia? Or, in more immediate terms: What is optimal at one and the same time for a pig, a penguin and a porpoise?

One possibility, of several, has to be that there never has been any such thing as Gaia. Another, suggested by Peter Westbroek of the University of Leiden in the Netherlands, is that Gaia once was, but is now only a fossil herself. And still another, that Gaia may indeed exist but we will never be able to separate her effects—some happening in minutes, some in hundreds of millions of years—from the blind impact that living things have on the world around them.

Lovelock said the hypothesis is in fact testable, but requires a planetary experiment. This is out of the question, he said, because NASA, which originally had agreed to help fund the meeting, just barely came through on that promise, never mind a planetwide experiment. And, of course, environmentalists would be outraged by such tampering. So he, like many of the geophysicists and climatologists at the meeting, confines himself to models. His best known is Daisyworld. This envisions a planet with continents and oceans, the land planted with daisies. As the planet's "sun" heats up, the daisies begin to germinate. The population of dark daisies explodes so that as much sunlight as possible is absorbed. When the planet gets too hot, light-colored daisies take over, reflecting away more sunlight and moderating the temperature.

The Gaia hypothesis may be tested first on a planet other than Earth. One of Lovelock's former graduate students, Andrew Watson, said "Gaia predicts life never existed on Mars because if it had it would still be there." The question of life on Mars is still open, despite the failure of the Viking missions in 1976 to find any evidence of it. Water once flowed there, carving canyons and leav-

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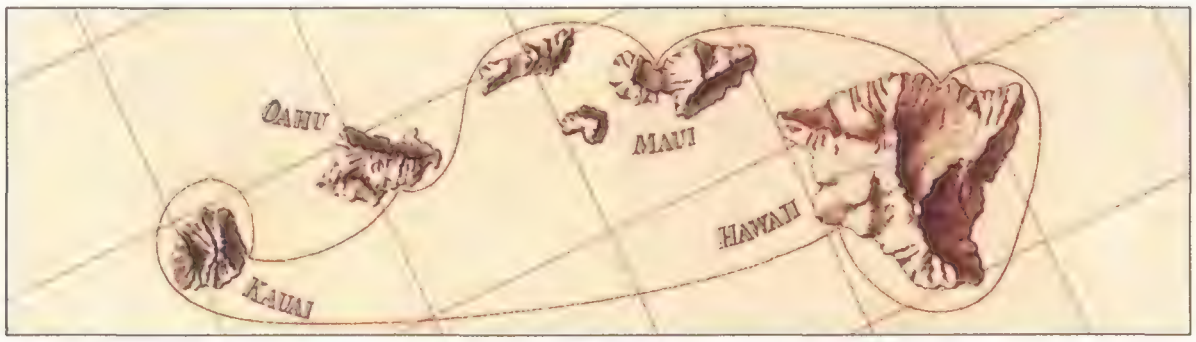

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James Lovelock refines his theories from his home in Cornwall, England.

ing dry lake beds. When Mars reaches opposition in September, coming as close to Earth as it has in 17 years, ground-based telescopes will be examining those ancient lake beds, looking for the spectroscopic signatures of molecules that could only have been made by life.

Lovelock himself is getting out. He was pleased by the meeting, glad that scientists were finally talking about his ideas. Often during the five days he smiled the quiet smile of a man who has started a free-for-all and then stepped back to watch the fun. But in September he will begin work on his autobiography; when that is finished, it will be time to move on to something new.

Whatever scientists and philosophers decide about Gaia in the years ahead, Lovelock strikes a responsive chord in many people. Speaking at the conference banquet, he said he is often asked what people as individuals can do. He replied: "It's personal action that counts. Any biological activation starts with a single organism." He and his family have planted 20,000 trees, an activity he realizes is not practical in New York City. Eat less beef, he urged—save your arteries and save the tropical forests from being cut to raise cattle. Then, clearly uncomfortable as a formal speaker, he abruptly broke off and sat down. A roomful of no-nonsense climate modelers and geochemists rose to their feet, clapping and whistling, led by the severest critics of the hypothesis itself. There is more to Gaia than our mechanistic science can yet measure.

John P. Wiley jr.

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Points of origin

English artist Henry Alken painted romantic *Moonlight Steeplechase* claiming it was the first such race run; in fact it never occurred.

The popular Kentucky Derby might have been the Kentucky Bunbury; it hinged on the toss of a coin in 1780

Before 1780, a horse race was only a horse race, and a Derby was just a man. His name: Edward Smith Stanley, 12th Earl of Derby. But by spring that year, big changes were about to be made.

Derby and Sir Charles Bunbury, a friend and fellow breeder of fine horses, had just founded a new race, a spring-time test (over a then-surprisingly short distance of a mile) of the fastest 3-year-old colt and filly Thoroughbreds in all England. But before the first race could be run on the yawning expanse of flat earth known as Banstead Downs, the contest had to be named.

The question was, which of the two partners would it be named for, Derby or Bunbury? A coin flashed in the air—and landed in Derby's favor. A good thing, too. Otherwise, we'd all be trooping out to Churchill Downs this May 7 to see the Kentucky Bunbury.

In fact, derbies have become such a splendid test of horses that more than a score of them are now held annually, worldwide. Inadvertently, the earl also christened a number of other things—and to think they were almost called bunburies. The Soapbox Bunbury? No problem. But a bunbury—meaning bowler? (Perhaps as consolation, Bunbury's horse, Diomed, *did* win the first derby.)

Horse racing is a very old business. Though the Romans and Greeks had spectacular horse racing competitions, and even built hippodromes specially for that sport, their horses pulled chariots. The emphasis was on the skill and bravery of the drivers, not the horses themselves. There was a great deal of wagering on the outcomes, but the sport was really a way of encouraging the arts of war: the horse and its chariot driver were formidable.

A tradition of winning at the hippodrome was thought to enhance prestige and encourage trade. Thus the little Greek city-state of Agrigento on the south coast of Sicily put its all into developing horses and drivers. The horses were so successful at the Olympic Games that many of the ancient coins of Agrigento bear a racing chariot.

To England go the laurels for developing both the Thoroughbred horse and the rules and regulations for horse racing. Smithfield Market, outside the City of London, saw races as early as 1174, and King Charles I patronized the races at Newmarket starting in 1625, and probably gave Newmarket's first Gold Cup in 1634. But he was not as passionate in his love of horse racing as was his son, Charles II, who not only jockeyed his own steeds but brought about a new standard of horsemanship. He wrote rules, settled disputes and generally promoted national interest in the sport.

One of the earliest documents about horse racing appears on a broadside in the collection of the Bodleian Library, Oxford. Dated May 26, 1662, it's loaded with details. Race length? Five miles of ploughed land, harrowed twice, seeded with hay. Heats? Three. Number of judges? One to weigh the riders (just 10 stone, or 140 pounds, each); this judge also presided at the finish line. A second judge made sure that all the horses reached the halfway mark before turning back. A third saw to a fair start.

To the winner went a cup worth £5 (at a time when a well-paid schoolmaster made about £10 a year), donated by the race underwriter, the Marquis of Newcastle. The entry stakes were to be ten shillings for each horse. The winner kept both the cup and his stake. Second place got the rest of the stakes.

Flat racing (on straightaways without jumps) was the invention and mania of the upper classes from its very beginning. They owned the land and had courses built all over East Anglia in the 17th century.

Such people worried about decorum. There were constant cautions against violence. The Marquis of Newcastle warned: "If any rider whip another rider, or his horse on the face, or pull back another's bridle, he shall lose the cup." What we'd call substance abuse was also monitored: during the half-hour rubdown between heats, the horses were to receive only "faire water." Jockeys were to be weighed between heats and were allowed to lose no more than two pounds in perspiration ("wastage").

Rules like these echo down the straightaways of racing history. The very repe-

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tition of them argues that they were regularly violated. The sport of kings? And gentlemen? Well, whenever money and wagering have been involved, people—pedigreed or not—have always sought ways of increasing their odds. Even the jockey of King George IV was discovered to have thrown a race.

The rough-and-tumble race known as the steeplechase was a far different matter. Originally, these cross-country meets were run over obstacles from one distant village steeple to another. They were organized by hunting-horse owners who wanted to prevent the Thoroughbred owners—who normally ran flat races—from winning the hunting races. The first record of a steeplechase dates back to 1752 in Ireland: it was a four-and-a-half-mile course from Buttevant Church to St. Leger Church. Aristocrats like Newcastle and Derby had sired flat racing, but steeplechases soon became big moneymakers for publicans and innkeepers. These races were the haunts of lower-class louts, gigantic booze-ups. The contrast was clear. By the 1880s, steeplechasing was the "recognized refuge of all outcasts, human and equine, from the legitimate turf."

The two reputations have now reversed. American steeplechases and point-to-points are the province of the weekend horsey set, the Upperville country squires, or at least people who would like to appear to be country squires—many of the same folks who wouldn't be caught dead bellying up to the $2 window at Belmont or Santa Anita on a Tuesday afternoon.

The horse is not native to North America, and it was from Spanish Conquistadores that American Indians got their mounts, which came mainly from the wild descendants of horses lost or sold by Cortés and De Soto. Over the centuries, horse racing grew to be a favorite pastime of the Plains Indians.

Henry A. Boller, a fur trader who from 1858-62 lived among the Gros Ventre Indians along the Upper Missouri, recorded one such scene: "Five or six young men are galloping away, in the direction of the creek, fully a half-mile distant. They are naked, with the scanty exception of a breechcloth, and control their spirited ponies with a lariat tied around the lower jaw.

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riders are coming this way. In one moment the competitors are spread out in line. The next they are hid from view by an intervening roll of the prairie, but the quick strokes of their horses' hoofs grow rapidly more distinct.

"The friends of the competitors yield to the impulse of the moment and make bets, throwing down robes, blankets, and guns. . . . The riders lean forward until they lie almost flat upon their horses, yelling, thumping their heels into their sides, and using the heavy Indian whip with a will. . . .

"Gathering all his energies for the decisive moment, the Crow-that-Flies shoots far ahead of the rest . . . and careers on at full speed until within a few feet of the edge of the precipitous bank of the river. Then, checking his horse so suddenly as to throw him back upon his haunches, he wheels sharply around and canters back to receive the congratulations of his friends."

Not that all of Boller's accounts of Indian races ended so congenially. A winning steed was once killed by an arrow that a disgruntled loser shot through its heart. Left for the ravenous village dogs, the carcass was picked clean before dawn the next day.

Early American patriots were so incensed at wasteful luxury in the Colonies that they tried to curb horse racing itself, never mind the wagering that attended it. On October 20, 1774, the Continental Congress sought no less than the eradication of "every species of extravagance and dissipation, especially all horse racing, and all kinds of gaming, cock fighting . . . and other expensive diversions and entertainments."

They had in mind something like the excesses of Virginian Charles Carter (1732-1806), owner of Shirley, a fine estate on the James River. He had a great silver bowl crafted with the image of his favorite horse, Nestor. There is a story that Carter filled it with champagne and gave it to Nestor after every race.

In the days before television news, the horse race was an important place for governing officials and politicians to display themselves to an admiring populace. The politicians are still with us, running their own races in this Presidential primary season. And, the Continental Congress notwithstanding, so are the Thoroughbreds. Indeed, as the Thoroughbreds run for Kentucky's roses this year, it's a good bet that the candidates won't be far behind.

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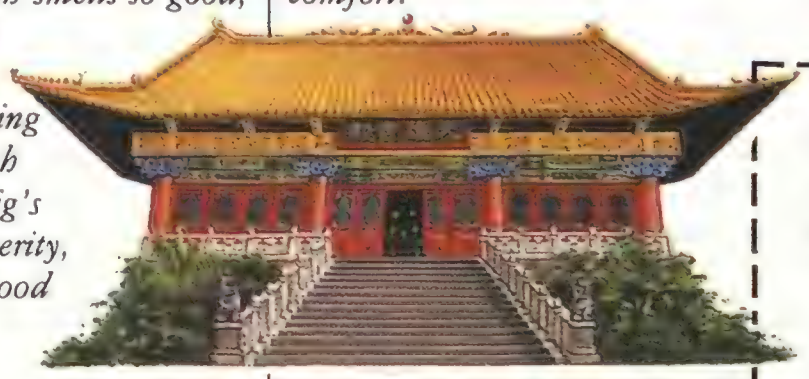

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By Michael Collins

The hairy ride aboard Gemini 10, a 'bridge' on our way to the moon

During an orbital mission in 1966, the author and his fellow astronaut John Young felt richer than kings—but a lot more vulnerable

The little old ladies of Worcester, Massachusetts, who sew and glue pressure suits for the National Aeronautics and Space Administration (NASA) have been good to me. My custom-tailored outfit is about as comfortable as it can be. I slip into it, lock helmet and gloves in place and begin breathing 100-percent oxygen to start the process of purging nitrogen from my system. This is the day John Young and I have been anticipating ever since we were assigned to the Gemini 10 spaceflight six months ago. It's July 18, 1966—launch day.

John is the commander and I'm his copilot. This morning we stayed up until 4 making last-minute preparations, then slept until noon. Now, carrying our portable oxygen containers like attaché cases, we leave the ready room at Cape Kennedy and ride in a small van out to the launchpad. Here we enter the grillwork cage of an orange elevator that clatters up the side of the gantry. On top, people help shove us down inside our Gemini capsule, attach parachute harnesses, oxygen and radio connections, shake hands and reverently close the hatches.

It is a little before 3:30 P.M. In less than two hours, if all goes well, we will lift off the pad with a deafening roar on a four-day trip, during which we will try to do a little bit of everything: set a world altitude record, rendezvous with two orbiting Agena rockets, dock with one of them and locate the other one without radar. Best of all, I'm scheduled for two periods of Extravehicular Activity (EVA), including an attempt to retrieve two experimental packages, one from our spacecraft, the other from the second Agena.

"On top, people help us down inside our Gemini, attach equipment, shake hands and close the hatches."

Although John and I are alone in our cramped quarters aboard Gemini 10, we're not lonesome, for over the radio comes a continual chatter from people in the nearby blockhouse and from Mission Control in Houston. It is mostly technical stuff but it includes the welcome news that our first Agena target, which was launched about 100 minutes ago from a nearby pad, has made it safely into orbit.

Down below, our Titan stirs as its two engines swivel back and forth during a final check. We feel a little shudder in the cockpit and then all is still again. Finally comes the ten-second countdown and, clutching an emergency ejection ring between my legs in a death grip, I hold my breath and wait for ignition. There it is! A slight bump and I know we're on our way.

We jerk back and forth a bit as the engines a hundred feet below work to keep us balanced despite gusty winds and sloshing fuel tanks. I can see a tiny patch of blue sky out my window but there is no sensation of speed until a thin layer of cloud approaches. Then—pow!—we burst through it faster than my eye can follow. We really *are* moving out. I begin to feel heavier and heavier, and now a mild fore-and-aft vibration causes the instrument panel to go slightly out of focus. At 50 seconds, we pass the altitude after which we can no longer use our ejection seats and I let go of the ring, my fingers tingling. Noise and vibration smooth out abruptly as we reach supersonic speed and thinner air.

In a minute and 20 seconds, we have accelerated from zero to 1,000 miles per hour and have climbed from sea level to 40,000 feet. As the first-stage tanks empty, we are up over five Gs, which means the pressure we are feeling is five times the normal weight of gravity. Suddenly, as the power shifts to the second-stage engine, I am flung forward in my straps, and the window changes from black to red to yellow. We find out later that the second-stage engine has blasted the

Illustrations by Pierre Mion

"The second-stage engine has blasted the top of the first stage, causing the oxidizer tank to explode."

top of the first stage, causing an oxidizer tank to explode—without damage to us but creating a spectacular light show visible even on the ground. As quickly as chaos came, order is restored; the second stage hums along quietly, and the window darkens again. Now a heavy hand is pushing on my chest but before I get too uncomfortable there is another lurch—and here we are, hanging in our harnesses, weightless at last. Out the window is the most amazing sight I have ever seen, a glorious panorama of sea and clouds stretching for a thousand miles in a glistening white light. In an instant, our little cubbyhole has been magically transformed. These are not ejection seats, but thrones facing out on the Universe—and we are wealthier than kings.

It is hard to believe only five years have elapsed since Alan Shepard became the first American astronaut to travel in space. On May 5, 1961, his short but successful Mercury suborbital flight burst upon the country like a breath of fresh spring air. Three weeks later, in a speech to Congress on "Urgent National Needs," our youthful new President, John F. Kennedy, outlined a lunar-landing program. Kennedy was excited about space. He asked Congress for an extra half-billion dollars in fiscal year 1962 and received it with remarkably little debate. Thus the incredible commitment was made—to journey a quarter of a million miles out into space, to land on a strange planet, to undertake an eight-day round trip—at a time when this nation's entire spaceflight data base consisted of Shepard's 15-minute foray. Radiation, meteoroids, weightlessness be damned! We were going for the home run and we were committed to doing it, in the President's words, "before this decade is out."

NASA shoots for the moon

Naturally I have no way of knowing, as John and I busy ourselves at the Gemini controls, that in a little more than three years I'll be circling the moon as pilot of the Apollo 11 command module while Neil Armstrong and Buzz Aldrin take mankind's first steps on the lunar surface. That unforgettable milestone will be the culmination of a vast and enormously complex undertaking, an effort involving thousands of scientists, designers, engineers, technicians, businessmen and bureaucrats, coordinated by an extraordinary team of NASA managers.

If Kennedy had said fly *around* the moon, the basic Mercury design could have been stretched enough to sustain one man on a six-day circumlunar voyage. But a landing! A landing led inexorably to the untested concept of rendezvous—the notion that two men could descend to the moon from an orbiting command ship in a smaller vehicle, and then find their way back. A landing, and subsequent exploration on foot, required

the development of a sophisticated pressurized suit, other specialized equipment and techniques for operating outside a spacecraft. And then, of course, there was the question of the human body being able to sustain weightlessness over the eight days required for a landing mission. So Project Gemini was needed to prove the concept of rendezvous, the technology of machines and the durability of humans. It would be a transition between the rudimentary Mercury capsule and the sophisticated Apollo system, a bridge between President Kennedy's bold objective and the national capability to achieve it.

New hardware for a new mission

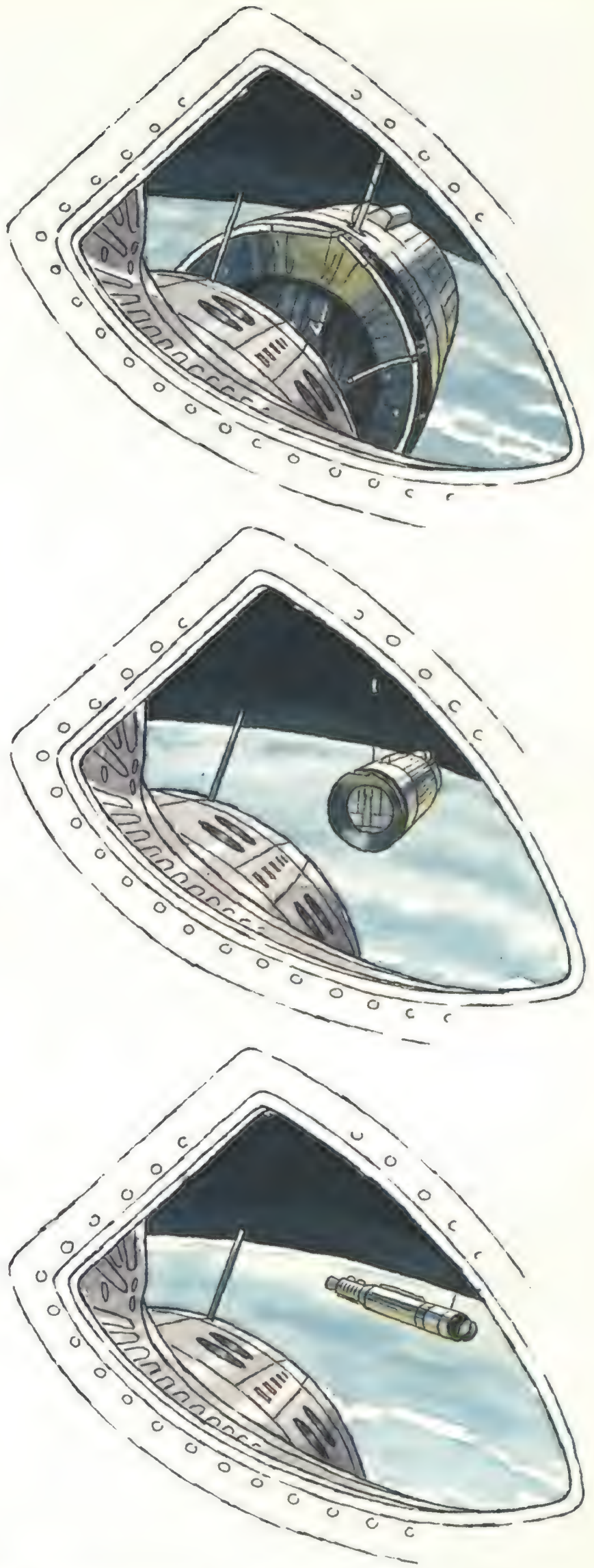
Not long after the program began, it became obvious that Gemini would have components totally unlike anything on board Mercury. Its booster would be a second generation ICBM, the Titan II, instead of the older Atlas. But the Atlas was still required, this time to launch Gemini's rendezvous target, the Agena rocket. The Gemini's nose would be fitted with a docking probe so that, once the capsule found the Agena in space, the two vehicles could be joined together as a rigid unit and then the Agena's motor could be fired to propel the docked pair into a different orbit. Radar and a digital computer were added to assist the rendezvous; the cockpit's environmental control system had to be modified to accommodate flights as long as two weeks; and a novel new power source, the fuel cell, was developed to replace the battery system, which was too heavy to provide electricity for long flights.

I had been hired as a NASA astronaut in October 1963, between the Mercury and Gemini programs. I was one of 14 in the third group selected. The original seven were the Mercury astronauts celebrated in Tom Wolfe's best-selling book (later a movie) *The Right Stuff*. The group of nine that followed were sometimes referred to by the press as the Gemini astronauts, and we 14 were dubbed the Apollo astronauts.

In 1964 there was only one manned mission, the first flight of a new Soviet craft called Voskhod. Nearly two years elapsed between Gordon Cooper's Mercury finale in May 1963 and the debut of the first Gemini twins, Gus Grissom and John Young. I needed that delay because I had a lot to learn.

After graduating from the U.S. Military Academy at West Point, I became a test pilot at Edwards Air Force Base in California. When I arrived at NASA's Manned Spacecraft Center in Houston early in 1964, I knew something about aeronautics but not much about Gemini. Little by little, I got comfortable with the idea that I might go into space—and fairly soon, at that.

The pace picked up in 1965. There were four manned Gemini flights that year after Gus and John



"We swing around the Agena in a tightening arc until John can guide our snout into the docking collar."

"Some kind soul has pasted on each plate a picture of a wildly beautiful girl. Up on the windows they go."

completed the premier mission, three trouble-free orbits, in March. Now, in 1966, there have been two more flights, and finally here we are in Gemini 10, an endeavor that project manager Chuck Mathews calls the "most ambitious of all Gemini missions to date."

John and I have assured ourselves that Gemini 10 is operating flawlessly as a spacecraft, and it is time for me to begin my navigational computations. The key to these is measuring precisely the angle between selected stars and the Earth's horizon. It's not as easy here as it was in the simulator. I can find the stars. They are old friends with mysterious names: Schedir, Hamal, Fomalhaut and Arcturus. My troubles begin when I peer through my sextant. Then the stars tend to disappear, especially in the airglow, the hazy layer of bright light that hovers just above the indistinct horizon.

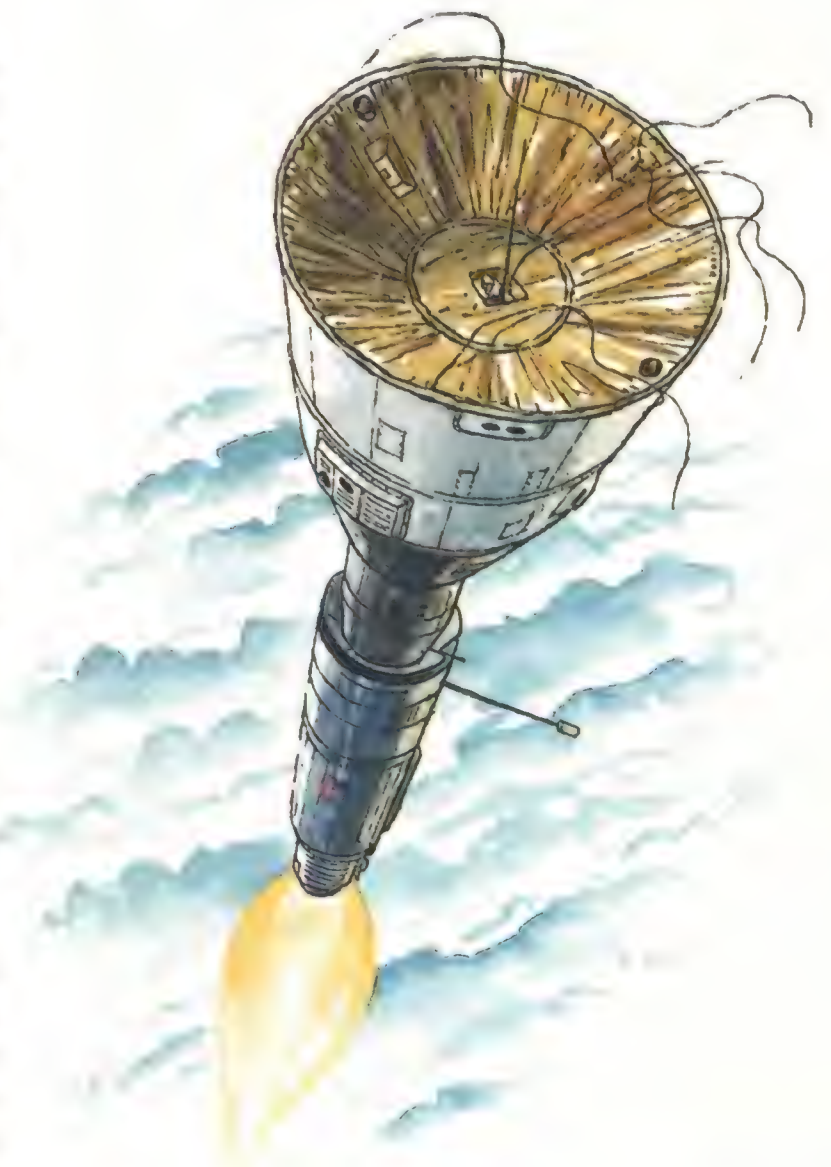
The success of our on-board navigation depends not only on accurate measurements but on tight timing as well, and yet I find myself slipping farther and farther behind as I fill charts and graphs with hastily scribbled numbers. I compare the maneuvers I have calculated—maneuvers that will enable us to overtake our Agena—with the solutions we are receiving from the ground. The results are quite different and we are forced to use the ground data, much to the chagrin of "Magellan," as John has taken to calling me.

Within four hours we have made three maneuvers, or "burns," by firing the rocket engines. As a result, we are 15 miles below the Agena and closing nicely. From now on, we're on our own: the ground can no longer help us. Until this point, we have seen the Agena only as a flashing light; we are just beginning to make out its cylindrical shape.

John is flying, and I am alternating between peering out the window and reading numbers from our computer. At a mile out, we are closing at 25 mph, which is about right. But then things start to go wrong. We have gotten off to one side somehow and our closing rate is dribbling off to zero. We have to thrust toward the Agena again, and we are swinging around it in a tightening arc. We have done this before in the simulator and we don't like it a bit. "Whoa, you bum!" John yells. We call this kind of curlicue maneuver a whifferdill, and it's the biggest fuel waster in the book. When John finally pulls up next to the Agena, only 36 percent of our fuel is left instead of the 60 percent we expected at this point.

Our spirits are restored somewhat by the docking. John guides our snout easily and gracefully into the Agena's docking collar. Latches snap into place and a motor pulls us tightly together. Everything looks OK as we prepare to start a second chase. This time we will be looking for the other Agena, the one that was left in orbit by the Gemini 8 mission four months ago.

The next rendezvous will be trickier because this target vehicle, some 100 miles above us, has long since



"I am about to tell John that we have a malfunction when—wham!—the whole sky turns orange-white."

run out of electrical power. It has no lights and—much more important—cannot respond to our radar's inquiring signal. We will have to make our moves using our eyes only.

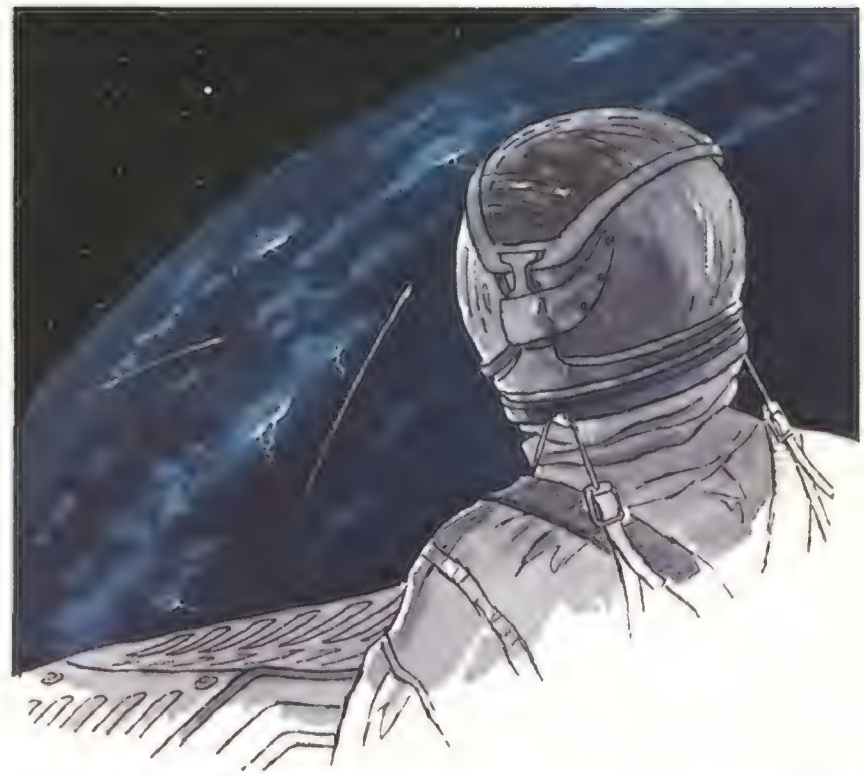
I communicate with our Agena by an encoder, a lever with which I send three-digit messages. For example, 251 means "Please turn on your lights." When we are ready to ignite its big engine, all 16,000 pounds of thrust, I tell it 041-571-450-521-501 and then hold my breath. An automatic sequence has begun. At the instant of ignition, I am disappointed to see only a string of snowball-like objects shooting out the back of the Agena. They are beautiful against the black sky, but I am about to tell John we have a malfunction when—wham!—the whole sky turns orange-white and we are plastered against our shoulder straps. It kicks like a mule, this engine, and in just 14 seconds it has added enough energy to eventually swing our orbit up to 475 miles, which is a world altitude record.

We are over Hawaii at the low point, or perigee, of our orbit, so the high point, or apogee, will occur 180 degrees from now on the opposite side of the Earth, over the South Atlantic. In the meantime, the Agena's big engine subsides, coughing and belching, and we are treated to a glorious Fourth of July spectacle. There is a golden halo surrounding the entire Agena. From its center, like a Roman candle, the engine is spitting out luminous chunks of residual fuel and oxidizer, some as tiny as fireflies, others as large as basketballs.

By the time we're ready to settle down for the night, it is 2 o'clock in the morning, Cape Kennedy time, and we have had a hell of a day. On top of everything else, my left knee has been aching for the past couple of hours, an indication that my preflight nitrogen purge did not work 100 percent. I have a mild case of the bends. Our method of turning out the lights is to clamp thin metal plates over the two windows. When we unpack them, we discover that some kind soul has pasted on each a photograph of a wildly beautiful girl. Up on the windows they go.

The first night in space is never a restful one. It's asking too much for the body to unwind, and my hands in weightlessness have assumed a life of their own. They dangle at a ridiculous angle out in front of my face, like the forearms of a praying mantis. I am afraid if I go to sleep with them in this position they may bump into some important switch. After a long while, I doze off for perhaps two hours of solid sleep. Then it's time to get going on Day Two.

Michael Collins' first book, Carrying the Fire, *was a best-seller. This article is adapted from his current book,* Liftoff: The Story of America's Adventure in Space, *due in June from Grove Press.*



"I see flashes from thunderstorms and an occasional meteor; it feels strange to look *down* on its fiery trail."

We ignite the Agena engine again to make our orbit come closer to that of our target, and I prepare for my first EVA. This initial peek outside will take me no farther than a yard above my seated position, but I am apprehensive nonetheless. After inflating our suits, we "dump" cabin pressure by opening a valve that vents the oxygen into the vacuum of space. That equalizes the pressure inside and outside of the cabin, so when I unlock the hatch, it swings outward freely in my hand. It is pitch black as I cautiously emerge to waist level. I have attached extensions to my oxygen hoses and radio leads that allow me to do this.

My first task is to photograph some stars in the Southern constellations using a special film that will register their ultraviolet signatures, or unique patterns of light. My God, the stars are everywhere, even below me! They are somewhat brighter than they appear on Earth, but the main difference up here above the atmosphere is that they don't twinkle. The Earth is barely discernible. The only noticeable light comes from flashes along a row of thunderstorms. An occasional meteor hurries into the atmosphere, and it's a strange sensation to look *down* on its fiery trail.

The sun comes up with a fierce burst of piercing white light. Shortly thereafter, my eyes begin to sting and water, making photography difficult. John is having trouble with his eyes, too, so I maneuver my huge pressurized suit back into the tiny cockpit and close the hatch. We then get on with our work.

Thanks to our Agena, whose fuel we have been using for maneuvers, we still have 30 percent of our own propellant left by the time Day Two is over. We

eat a good meal and hit the sack. Tonight this little cockpit doesn't seem like such an outlandish place to sleep and I drift off quickly.

The next thing I know, there is a voice in my ear: Houston is calling us to get started on Day Three. It's going to be a busy one. After breakfast, we make two small orbit adjustments, still using the Agena's power. Then we separate from our old friend. For the past 40 hours, we have been circling the world, often craning our necks like someone in a caboose trying to see around the locomotive up front. Now we can enjoy an unimpeded view.

We're only eight miles below the Gemini 8 Agena and closing at a cautious rate, in deference to the fact that we have no radar to assist us. We see it for the first time, a tiny speck at which John points our nose. While he tracks it precisely, I measure the rate at which our nose's angle above the horizon is increasing. By comparing these actual angles with a chart full of theoretical ones, I am able to calculate when we should depart this orbit and transfer to an intersecting trajectory. Getting there without wasting fuel is only half the problem; the other half is getting there on time—before sundown. With no radar, we would surely slide by our target in the darkness.

Things look good as we close in. The Agena grows from a dot to a cylinder. I give John estimates of our range and closing speed, but beyond that I can only shout words of encouragement. He brakes smoothly, and now we are riding serenely beside the Agena, with our fuel gauge reading 15 percent. Not bad!

We would like to rest a bit at this point, but we cannot. The sun goes down abruptly as usual—at the speed we're orbiting, daylight lasts for only 52 minutes—and John and I each pursue our own demanding tasks. He flips on our searchlight and, for the next 37 minutes of darkness, flies formation with the Agena. This is hard work because he must never allow it to wander out of the tiny circle of illumination from the searchlight. At the same time, he must be parsimonious with our fuel, making as few corrections as possible. While John is doing all this, I am busy unstowing and installing all the gear I will need for my space walk. There is a 70-step checklist I must go through, and these are crucial steps because once we dump cabin pressure I am utterly dependent on this equipment.

The three main items are my chest pack, an umbilical cord and a hand-held maneuvering unit. Then there are cameras, experiment packages, checklists and various minor pieces of hardware. Assembling the equipment is not a tidy process, due mainly to the bulk of the chest pack and umbilical cord. The latter has been tightly coiled under John's feet, but when it is unstrapped it expands, all 50 feet of it, and tries to fill the whole cockpit. Its function is to feed high-pressure oxygen from the spacecraft to the chest pack, where a regulator reduces the pressure and feeds it into my suit, where I will need it to breathe. The umbilical cord also contains a nitrogen hose, radio wires and a stout nylon tether to prevent me from pulling something loose. The nitrogen is routed from a spacecraft tank, through a connector just aft of the cockpit, to my maneuvering unit. This is a gunlike device that squirts a jet of nitrogen out through three nozzles, two pointed aft and one pointed forward. It has a trigger that I squeeze between my right thumb and index finger. The force of the nitrogen produces a kick in the opposite direction. By pointing the gun and squeezing the trigger in certain ways, I should be able to maneuver myself around.

Watch out for thruster No. 16!

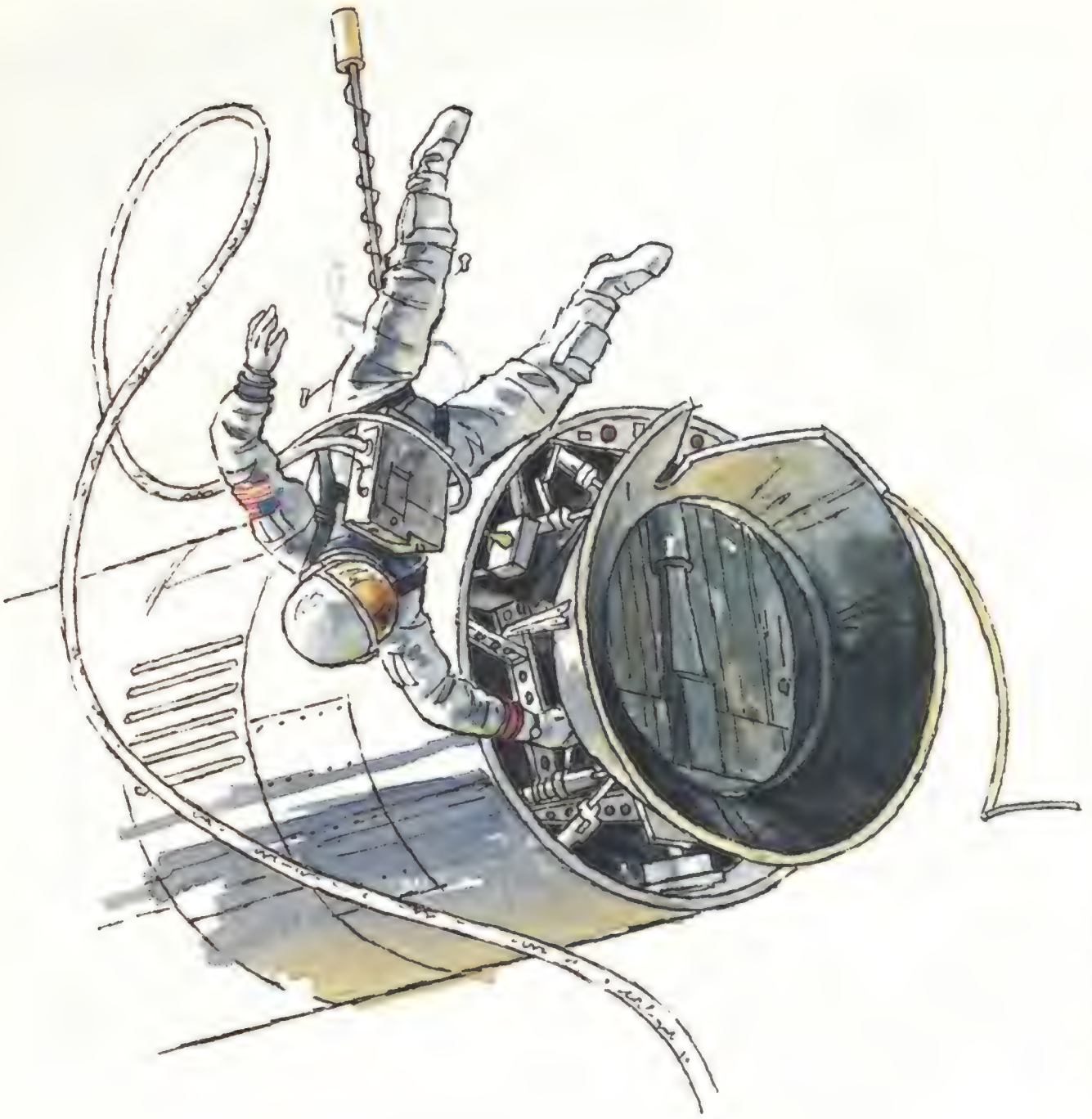
As dawn arrives, I am on schedule and ready to go. John pulls a ring to dump cabin pressure. It takes a little while for all the oxygen to escape, like water draining from a bathtub, and while I am waiting I review some of the things I must do and not do. High on the list is a requirement to coordinate with John the firing of our thrusters. At one time or another, he will use all 16 of them to keep us in proper position next to the Agena; but if I am next to one he must wait, because its hot exhaust fumes may blow a hole in my suit or gloves. Each thruster is a small rocket motor, and dangerous. Thruster No. 16, the one that moves the Gemini downward, is of particular concern because it is located next to the connector for my nitrogen line. It is also close to the micrometeorite experiment that I am to unfasten and return to the cockpit. This package and a similar one on the Agena are both designed to measure the impact of micrometeorite bombardment.

"I know that if I do nothing I will wind around the Gemini and then splat up against it at very high speed. My salvation is my maneuvering gun [upper left] but it is gone. Finally I locate the hose and reel it in."

When the time comes, I open the hatch, move out of the cockpit gingerly and raise a handrail that has been stowed flush against the side of the ship. Using the rail, I move to the rear and remove the micrometeorite detection plate that has been exposed the past two days. I caution John not to fire No. 16. "OK," he replies, but then adds, "Well, Babe, if I don't translate [move] down soon, we're going to run into that buzzard." The more nervous John gets, I've noticed, the more he calls me "Babe."

By now I am clear of No. 16. I hand the plate in to John and return to plug my nitrogen line into the connector behind the cockpit. Again I warn John and again I get the same answer. I get out of the way of the thruster, and John maneuvers. Then I move back and connect the nitrogen line, but not without encountering some difficulties.

The problem is twofold. First, my legs are flailing back and forth in response to the slightest torque that my arms put on the rail or the connector. Second, I have missed on my first attempt to stab the connector with the fitting on the end of my umbilical. The sleeve



"As I go by, I am able to snag the Agena with my left arm. As my body swings around, I plunge my right hand inside a recess between the docking cone and the main body of the Agena. I have got a fistful of wires now and won't get thrown off."

on the fitting has sprung forward and must be re-cocked, but that is a two-handed operation. I let go of the rail for an instant, recock the sleeve and grab the rail again. In the process, I swing wildly and my legs bang up against the side of the spacecraft. John feels the commotion and so does the Gemini's attitude-control system, which reacts to this unwanted motion by firing thrusters to restore equilibrium. "Boy, Mike, those thrusters are really firing," John says. "Take it easy back there, right?"

I return to the cockpit and talk John into position because I can see the Agena better than he can. When we are six or eight feet below and behind one end of it, I ask him to back away a little and then I tell him I'm ready to jump. "Take it easy, Babe," he replies.

Actually, "jump" is the wrong word. I push off from the open cockpit gently, trying to shove equally with each hand so that I will come away straight. As I float up and slightly forward, I note with relief that I'm not snagged on anything and I seem to be headed in the right direction with no tendency to pitch, yaw or roll. Within a few seconds I collide with my target, the docking adapter on the end of the Agena.

The experiment package I am to retrieve is on this end, but it's a bad place to land because the docking cone has a smooth, tapered lip that's hard to grasp with my inflated gloves. I head to my left to get the package, going hand over hand. As I move, I dislodge part of the docking apparatus, an electric discharge ring that springs loose and dangles there. It looks like a thin scythe with a wicked hook. I suspect it is fragile and will pull away easily; still, it is made of metal and I don't want to risk getting ensnarled.

Now I've reached the package. I try to stop but the momentum in my lower body causes me to keep going and peels my hands right off the Agena! I am turning lazy cartwheels somewhere above and to the left of everything that matters. All I can see is black sky. While I am trying to figure out what to do next, the Gemini swings into view down below me.

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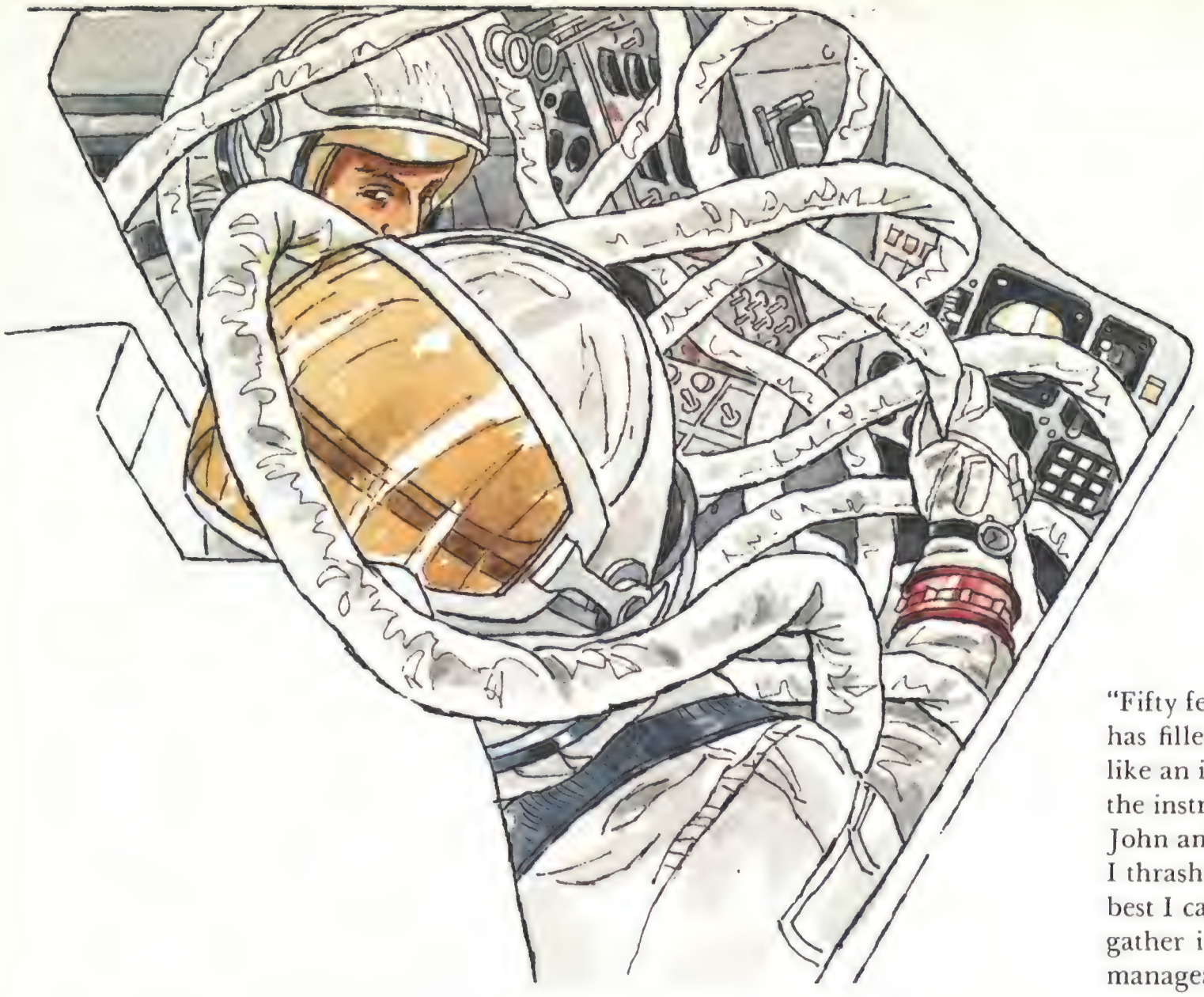


"Fifty feet of umbilical has filled the cabin like an ice fog, obscuring the instrument panel, John and everything else. I thrash around as best I can, trying to gather it into a manageable package."

"Where are you, Mike?" John doesn't sound too happy.

"I'm up above," I reply. "Don't go any closer if you can help it, OK?"

If John gets any closer to the Agena, which he may not be able to see right now, my umbilical might get tangled up with the dangling electric discharge ring. But that worry is suddenly displaced by another one. I have swung out to the end of my 50-foot umbilical and am moving away from the Agena. The laws of physics tell me that if I do nothing I will wind around the Gemini like a top and splat up against it at a very high speed. My salvation is my maneuvering unit, my gun. I reach for it, but it's gone! I grope around and find the hose leading to it, and reel it in. By now, my arc has taken me high off to one side of the Gemini and I am swinging around toward the rear. I start spraying nitrogen like crazy and slow down enough to make an airplanelike approach to the cockpit, gliding in from behind. I never intended to get back here and I don't like it. This is where all the thrusters are.

"I'm back behind the cockpit," I advise John, "so don't fire any thrusters."

"OK," he says, but adds, "we have to go down if we want to stay with it [the Agena]."

That is the worst possible news. Not only will the thrusters be blasting right at me but, if the Gemini goes down, I am going to skim over the top of it and begin another curlicue. "Don't go down right now," I plead. *"John, do not go down!"*

I must sound worried because he mutters "OK."

My approach is not graceful but it will do. I bang into the open hatch faster than I would like but manage to hang on. I get partway back inside the cockpit and reel the umbilical in after me. I'm going to have to try something different. John maneuvers us into position again but a bit farther away from the Agena. It looks like the docking cone is 15 or 20 feet in front and above me when I leave the cockpit. This time, instead of pushing off I use the gun.

Up I glide, but my left boot snags on something and causes me to start pitching face down. If this continues, I will hit the Agena with the small of my back, so I start squirting away with the gun. The gun not only rotates me but raises me as well, and I discover to my horror that I am about to cruise over the top of the Agena. I manage to make one last frantic correction and as I go by I am able—just barely—to snag the Agena with my left arm. As my body swings around this pivot point, I let go of the gun and plunge my right hand down inside a recess between the docking cone and the main body of the Agena. I've got a fistful of wires now and I'm not about to get thrown off.

After all this, I've lost my bearings and don't know which way to go to find the experiment package. Finally, moving hand over hand again, I make my way around to it. The package is enclosed by a fairing and held in place on rails. I depress two release buttons and give a jerk. The fairing springs loose, and attached to it by wires is the package. Success! And not a minute too soon.

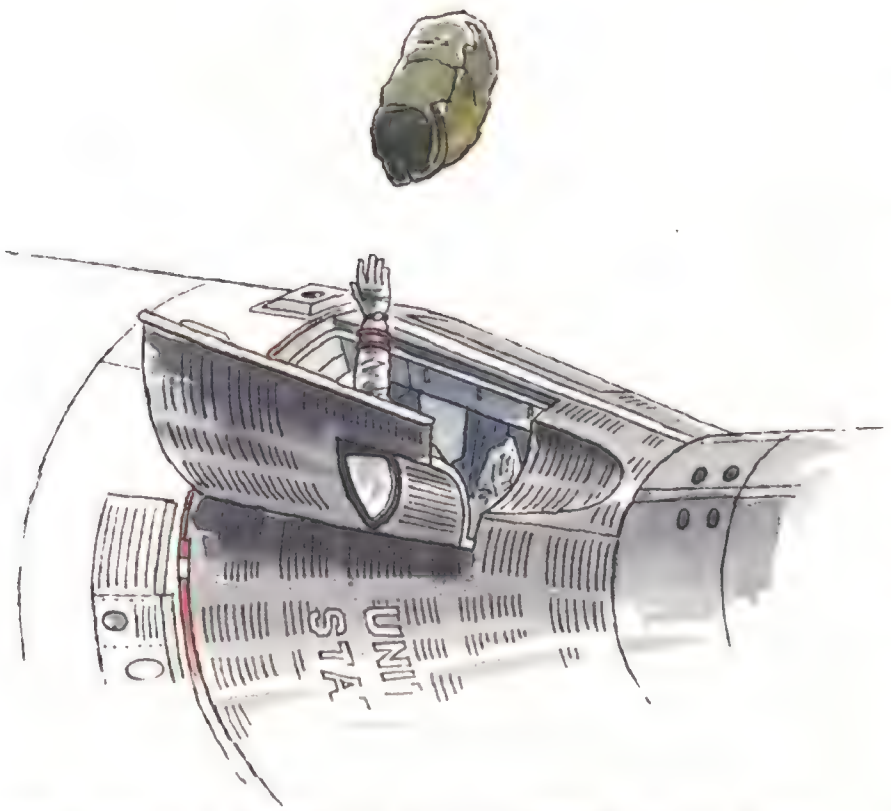
The Agena is gyrating around in response to all my banging. John is having a hard time staying in position and he's worried about my umbilical getting fouled up. "Come back," he warns. "Get out of all that garbage. Just come on back, Babe." That suits me fine.

Back in the cockpit, I discover that my camera is missing. A 70mm wide-angle Hasselblad, it had been attached by a bracket to my chest pack but somehow worked its way loose and floated off. It will orbit by itself for years, full of spectacular pictures of Gemini and Agena. But there's no time to brood; we have other things to worry about.

While I'm cranking the hatch's locking handle, Houston asks John for a propellant-quantity reading. "Get serious," he growls. Fifty feet of thick umbilical has filled the cabin like an ice fog, obscuring the instrument panel, John and everything else. I thrash around, trying to gather it into a manageable package. In the process, I bump one of the radio switches, causing us to temporarily lose contact with Houston.

After jettisoning a duffel bag crammed with empty food packages, the umbilical and other equipment we no longer need, we use most of our remaining propellant to lower our perigee from 250 to 180 miles. That's a precaution in case one of our four solid retrorockets refuses to fire during reentry tomorrow. We spend the next couple of hours on experiments and then—for the first time in 53 hours—we have some free time. Actually we have a 10-hour sleep period, but we certainly don't need that much sleep. With no Agena stuck on our nose, and since we are running low on fuel anyway, we let the Gemini drift and wander.

"Somehow my camera worked loose from my chest pack and floated off. Now it will orbit for years."



"We jettison a duffel bag crammed with empty food packages, umbilical and other gear we no longer need."

I've done loops and spins in a fighter plane, but I've never flown sideways or backward. Now we're doing that and more, tumbling slowly, smoothly, aimlessly. It's a stately roller coaster ride, utterly silent, with no jerking around and no hollow feeling in the pit of the stomach.

The view out the window is worth all the months I spent cooped up inside a simulator preparing for this mission. The curvature of the Earth 200 miles away is readily apparent. The sky is black instead of blue; otherwise the colors below are unchanged, except that the unfiltered sunlight makes clouds and water brighter and shinier. The fact that we are sailing through space at 18,000 mph is offset by our altitude, so that the ground appears to go by the window at about the same rate as from an airliner. Despite the familiarity, the feeling I get looking out the window is totally different from anything I have imagined. Those aren't countries going by, they're continents; not lakes, but oceans! Look at that, we just passed Hawaii and here comes the West Coast, visible all the way from Alaska to Mexico. San Diego to Miami in nine minutes flat! If I miss something, not to worry; it will be back in 90 minutes. Up here, there are no misty days or gloomy skies. All is glorious sunshine. This is a better world than the one down below. Savoring not only the view but also the day's accomplishments, I drift off to sleep.

Day Four begins with the usual bugling from be-

"'We're going to hit like a ton of bricks, I announce. Amazingly, we don't. We plop softly into the Atlantic."

low—in this case, our ground station in the Canary Islands. After breakfast, as we make our final orbit, we thank the folks in the various tracking stations we pass over. "Have a good trip home," Canary says. John makes his speech: "Roger. Thank you very much. Enjoyed talking to you. It's been a lot of fun. . . . Want to thank everybody down there for all the hard work." This is more than just a pro forma courtesy. Because of our excessive fuel usage, the troops in Mission Control have really been put to the test. They have done a masterful job of reshuffling the schedule and getting extra work from our Agena, so we have accomplished almost everything we set out to do.

Retrofire is a serious business. It involves firing our rockets in order to slow down and drop out of our orbit. We prepare for it with a solemnity that exceeds even that of the launch. Every item on the checklist is marked off carefully, and then the marks are checked. We even discuss *how* I am going to punch a particular row of buttons. "Push them in the center, push them down hard, and hold them down for a good fat one second," John lectures me.

As retrofire time approaches, I find myself peering out the window for the tenth time to make sure that our heat shield is pointed forward, so that the retrorockets will slow us down and not speed us up. If we mess this up somehow, we will become a permanent Earth-orbiting satellite. Canton Island in the South Pacific comes on the air with the inevitable countdown, "3 . . . 2 . . . 1 . . . RETROFIRE!"

Four welcome slaps on the back

After three days of weightlessness, my body is supersensitive. I feel each of the rockets slapping me on the back as they fire, one after the other. "I count four beautiful ones, John-Babe." "Yes," he replies, and then reports to Mission Control, "That was a superfine automatic retrofire—303 aft, 5 right, 119 down."

He means that our velocity has been reduced by 303 feet per second forward, 119 feet per second down toward the Earth, and five feet per second to the right. This is almost perfect. Now we jettison the retrorockets, exposing our heat shield, and John concentrates on steering toward the point at which our computer thinks our landing ship, the aircraft carrier *Guadalcanal,* is located, 530 miles southeast of Cape Kennedy. It's like making gliding turns in an airplane, except that we are upside down and facing backward.

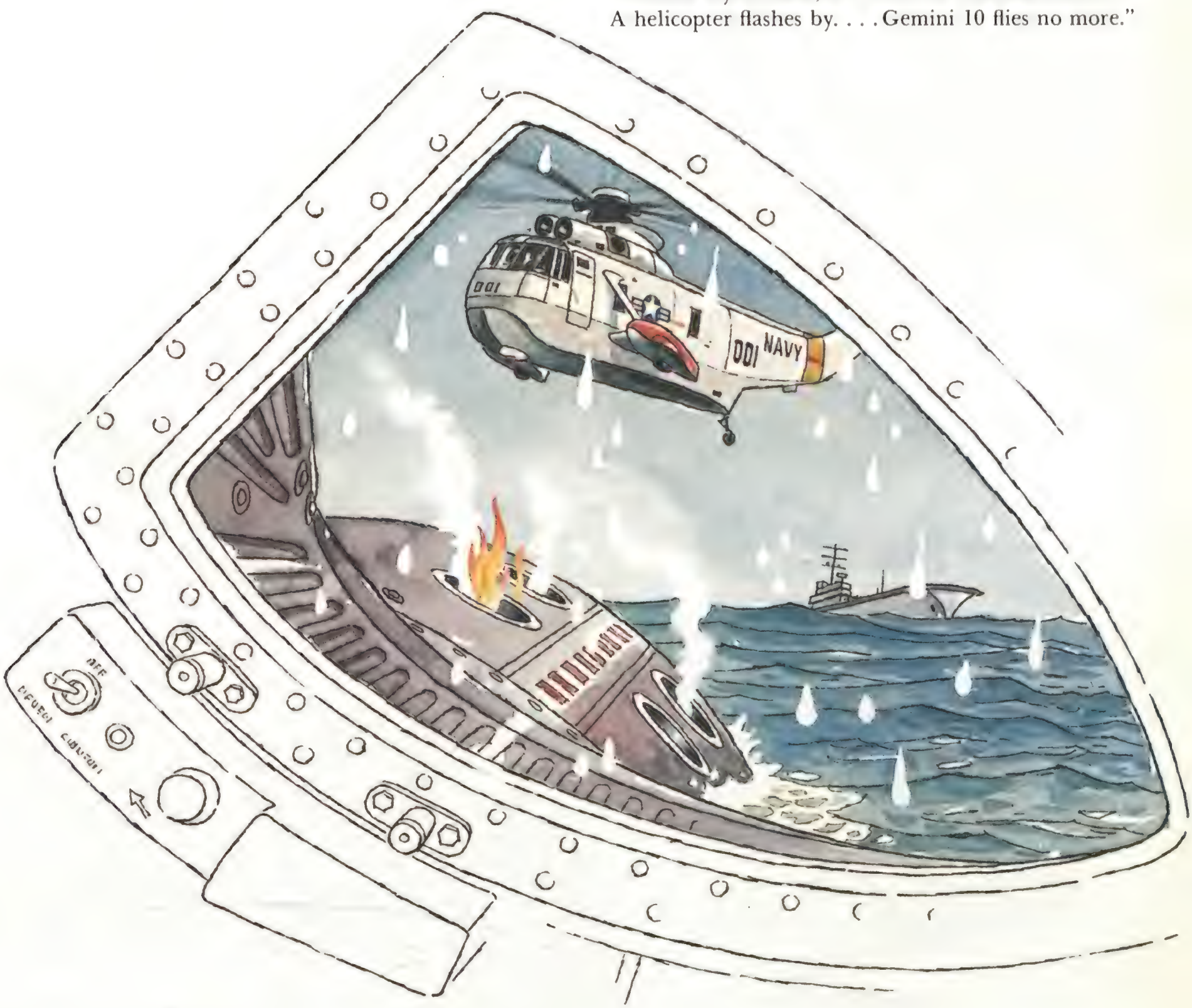
I can tell that the heat shield is doing its job because we are developing a tail. Tenuous at first, then thicker and more startling, it glows an eerie red and yellow. John has seen this before but I have not. "Man, that's starting to look like something," I exclaim. "Look at that son of a gun burn!" Occasionally a small chunk of

heat shield breaks loose and adds sparkle to the halo. "Fly that thing, John! You're doing a beautiful job."

At 38,000 feet we release our drogue parachute, which is supposed to stabilize us. Instead, we begin to swing back and forth. "Shoot," John grumbles and he deploys the main parachute early. It fills our windows with red-and-white reassurance. Houston reports that they can see us on TV, so we must be in the right place. When we swing down to the horizontal position, we can tell that we are rotating on our parachute because the clouds are whizzing by our windows sideways! I figure this strange motion is going to increase our descent rate. "Boy, we're going to hit like a ton of bricks," I announce. Amazingly, we don't. We plop softly into the Atlantic. We must have caught the lip of a descending wave.

It is a mild and gentle day and the sea is mercifully quiet. My ears are blocked from the swift descent, and there is an unaccustomed aroma of burned chemicals in the air. Outside my window, the nose-mounted thrusters hiss and smoke, emitting an occasional tendril of weak flame. A helicopter flashes past our prow, and then swimmers appear and surround us with a stabilizing rubber collar. Gemini 10 flies no more. We are trespassers here, at the mercy of a new set of EVA experts clambering around us. I tell them, "Hey boys, take your time. We're not in any hurry. We don't want anyone getting hurt out there." It is over.

"Outside my window, the thrusters hiss and smoke.
A helicopter flashes by. . . . Gemini 10 flies no more."



It could get by

©1988 American Honda Motor Co., Inc. LXi model shown.

on looks alone.

The New Accord Coupe HONDA

Národní Gallery, Prague

In powerful work of the Breton period, Gauguin dramatically presents himself as a traveler or wanderer and calls it *Bonjour, M. Gauguin.* The artist was fond of painting self-portraits throughout his life.

By Robert Wernick

Opening the door to the art of the 20th century

Beneath the storms and dramas, the highs and lows of his tempestuous life, Paul Gauguin was a profoundly effective master

"How do you see these trees?" asked the master. "They are yellow. Well then, put down yellow. And that shadow is rather blue. So render it with pure ultramarine. Those red leaves? Use vermillion."

It was a sunny October day in 1888 at a picturesque spot in the little wooded area known as Bois d'Amour near Pont-Aven in Brittany. The master was Paul Gauguin and he was laying down the laws of the new painting to his young disciple Paul Sérusier. Stroke by stroke the pupil put it all down—the autumn foliage, the old mill, the reflections in the quiet water—on a small wood panel, possibly a cigar box. He took it to Paris and it hit the bright students in the art schools like a bolt of multicolored lightning. They were grouping together under the name of Les Nabis, the Prophets, and they pounced on this little painting as their standard and guide; they called it *The Talisman* (above). It was the magic key with which Paul Gauguin allowed them to open the door into the 20th century.

And now, the most complete collection of Gauguin's work ever assembled may be seen in an exhibition that opens May 1 at the National Gallery of Art in Washington. The show, which runs through July 31, goes on to the Art Institute of Chicago (September 7-December 10) and then to the Galeries nationales du Grand Palais, Paris (January 10-April 20, 1989).

Eighty-five years ago this month Gauguin died on the island of Hivaoa in the Marquesas. The cause of death was a combination of syphilis, heart disease, running sores and massive doses of alcohol and morphine.

Musée d'Orsay

Coached by Gauguin, Sérusier painted *The Talisman*, which promptly became a landmark for young artists.

The fascination of Gauguin's uncommon character and uncommon life—sensationalized and sentimentalized by his own efforts as well as by a succession of novels and movies—has tended to distract attention from his very considerable achievement as an artist. The 243 items in the new show not only provide an explosion of visual delight, but document just how much of 20th-century art derives from him. The flashing colors of the Fauves, the radical restructuring of the Cubists, the anarchic sprawl of Abstract Expressionism can all be said to come from the Gauguin-Sérusier panel.

Gauguin was 40 years old at the time, already accepted as a leader of the advance guard in a period of artistic revolution. In his 20s, when he was a rising young stockbroker in Paris, he had begun to devote all his spare time to painting. He had become acquainted with the Impressionist master Camille Pissarro, and by 1885 when he left his wife and five children in Copenhagen to return to Paris and devote his life to art, he had become an accomplished Impressionist himself, a master of dazzling and daring color harmonies.

But like many of the young men in the Paris art

National Galleries of Scotland, Edinburgh

In *The Vision after the Sermon*, Gauguin shifted away from Impressionism to an entirely different style, Synthetism, because "I wished to force myself into doing something other than what I know how to do."

world, he was dissatisfied with Impressionism, which had seemed fresh and daring enough in its day, but now was being seen as only the last gasp of what he called the "abominable error of naturalism" that had dominated Western art since the Renaissance. The Impressionists tried to capture exactly the play of light on the surface of things, while the young rebels wanted to get below the surface, down to the mysterious depths. Besides, the Impressionist theories of light were too mechanical for Gauguin. Though he was ready to pontificate about complementary and derivative colors with any of them, instinct always came ahead of theory when he got down to paint. It is said that he once threatened to shoot one of his disciples if the fellow went on automatically putting complementary colors beside each other.

Exactitude, he wrote to his friend Vincent van Gogh, was of no interest in art. Sit in front of nature, was his advice, and then dream about it, let it be absorbed in the crucible of your eye and mind, and serve it up stark and simplified on your canvas, a synthesis of what you have seen and what you have felt. Hence the name Synthetism—one of that phalanx of isms that have clanked their way down the corridors of modern art—for the flat, simplified, decorative style, influenced by medieval stained glass and by Japanese prints, that he and a 20-year-old enthusiast named Emile Bernard worked out in Pont-Aven in 1888, the year of *The Talisman*. There would later be acrimonious and unedifying disputes over which one would get

The author has written widely on cultural, historical and other subjects. He wrote most recently on the mystery of the Druids of Britain in the March issue.

credit for originating it. Bernard was probably the first to put it into words. Gauguin was the first to create undoubted masterpieces of Synthetist painting.

Vision after the Sermon (opposite) is the best known of the paintings that came out of Pont-Aven. Here in a space violently cut in two by a slanting apple tree, a group of Breton women, just out of church, are witnessing a scene they have heard described by the priest: the wrestling of the patriarch Jacob with the Angel of the Lord at Peniel, as described in the Book of Genesis. Everything in this work was intended to disconcert the eye accustomed to the smooth photographic realism of academic art. The figures are stiff, simplified, stylized. There is no concern with perspective. There is no horizon. The colors—the vermillion grass, the blue and yellow of the angel—are chosen arbitrarily for their emotional effect, without any concern for the ordinary ideas of what grass or angels should look like. The whole impression is rude, ungainly, archaic. Gauguin himself wrote to his friend Emile Schuffenecker that he wanted to catch the "dull, muffled, powerful tone" he heard when he walked in his wooden clogs across the hard, granite soil of rural Brittany.

Disciple of the savage god

That muffled sound was one that the livelier members of the art world were ready to hear. The advanced opinion of the 1880s took it as gospel that Western civilization had come to a dead end. Modern man was living a futile life on a rubbish heap of mechanical devices, with no soul or purpose. Anything to escape from what Gauguin called the "long and fatal heritage of the vices of a morally and physically corrupt society." The end was at hand and bound to be violent. After us, the savage god! cried William Butler Yeats.

Gauguin was more than ready to oblige. Everything he did was meant to give a rough, unfinished, savage look, even the coarse burlap on which he liked to paint. His Peruvian grandmother and his childhood years spent in Lima gave him the right to claim an Indian, an Inca, past. His years at sea before the mast and as a junior officer gave him a taste for exotic places, complaisant women and hard liquor—along with the physique to enjoy them. He was a powerful man, an enthusiastic boxer and fencer, a legendary toper, with an ingrained disrespect for authority and respectability. He was ready to take on any attractive woman who came his way. He could hold people spellbound with his sailor slang and swagger. Those who saw him dance the *upaupa* in his Paris studio with the bright yellow walls, or listened to him discourse on art and life through long bibulous evenings at the Café Voltaire, were carried away with what a friend, the painter Maurice Denis, summarized as his "talent, eloquence, gestures, physical strength, biting irony, inexhaustible imagination, capacity for alcohol, and romantic bearing."

He was delighted when Degas compared him to the wolf in La Fontaine's fable, who prefers a life of hunger to wearing the collar of the well-fed dog. Not that Gauguin deliberately sought out hunger. He had shown a knack for making money on the stock exchange, enough to support a family of seven and buy a distinguished collection of paintings by Cézanne, Monet, Degas, Pissarro, and he saw no reason why he should not make much more as the leading painter of his day. He also had a keen sense—well ahead of his time—of how to manipulate what in these days would be called his image. "If you knew," said Pissarro once, "how shamelessly Gauguin behaved to get himself elected (that is the word) a man of genius."

Gauguin did spend most of his life in poverty, though not quite the wretched poverty he wanted the world to believe. There were bitter moments when he had to earn his living by hanging posters in a Paris railroad station or by digging ditches in Panama. But the pathos of his letters, with their despairing wails and appeals for funds, is sometimes undercut by other records, such as the books of the merchant on Hivaoa who sold him 202 liters of red wine, 25 liters of ab-

Museum of Decorative Arts, Copenhagen

Ceramic jug in the form of a head is also a self-portrait and an example of Gauguin's masterly hand.

Private collection

Museum of Modern Art

Still Life with Three Puppies, 1888, dealing with decorative form, anticipated Matisse and Bonnard.

sinthe and assorted spirits and 80 bottles of beer in the last four months of his life.

If only, he would say, he had been born rich like Cézanne or Degas. There is no certainty that this would have put everything to rights. When in 1893 he came into a small inheritance from his Uncle Isidore, he ran through it in a few weeks, and the round of begging and complaining letters began again. His pleas did not necessarily fall on deaf ears. Almost always when he was desperate, there were friends to help him out. Jacob Meyer de Haan, a Dutch painter whose gnomelike face flickers in and out of Gauguin's work, paid his rent in Brittany. His favorite picture dealer, Theo van Gogh, Vincent's brother, labored tirelessly to find buyers for his paintings and personally put up the money for Gauguin's fateful two-month visit to Arles, where he and van Gogh worked side by side and produced some of the greatest paintings of the century—till the clash of their personalities ("one a volcano, the other boiling, too," wrote Gauguin) led to Vincent's breakdown, the slit ear and Gauguin's precipitous flight back to Paris (SMITHSONIAN, October 1984).

Gauguin was genuinely fond of both van Goghs, and was deeply moved by Vincent's suicide and Theo's death of grief and strain a few months afterward. But being Gauguin, he could not help moving on to more important business as soon as possible. "Let us examine the situation coolly," he said in a letter to Emile Schuffenecker. (Since the letter is undated, it is not clear which brother's death he is referring to.) "We may be able to derive some advantage, if we are clever, from the van Gogh disaster."

Pushkin State Museum of Fine Arts, Moscow

Opposite: Painter Maurice Denis bought one of many self-portraits Gauguin made during his life. This one, *Self-Portrait with the Yellow Christ,* is among artist's most self-searching.

Of *At the Café,* Gauguin wrote, "I've also done a café which Vincent likes very much and I like rather less. Basically, it isn't my cup of tea...." Vincent was his friend van Gogh.

For nothing in Gauguin's life was ever allowed to get in the way of his central conviction that he was a genius and that to genius all things are permitted. "He is wholly absorbed," wrote his wife, Mette, "in contemplating his own magnificence." He occasionally shed bitter tears over the family he had abandoned, particularly his daughter Aline. But his mind was set. His family would have to take care of itself in Copenhagen while he roamed the world. He did, however, expect his wife to keep on marketing his paintings in Scandinavia, and he wanted her to remain faithful to him during the years of his absence. Friends were supposed to supply encouragement and money and enthusiastic reviews, and sometimes room and board in addition to sitting for their portraits.

Gauguin's favorite subject for portraiture was himself, the dramatic actor in his many roles. On occasion he could paint himself as he must have appeared to his pals around the absinthe bottle, rough-hewn and sardonic, Barnacle Bill the Sailor. In a mischievous moment he could be a playing-card Satan with a halo over his head, a snake in his hand and a sly leer on his face. He could also be a dignified Old Master, as in the *Self-Portrait with Palette,* with his painting hand emphasized to recall a famous portrait of Titian's. His favorite image of himself was as the outcast, misunderstood, reviled and mocked. Or he might be the ultimate martyr, putting his features on the face of Christ in the Garden of Gethsemane or on the hill of Golgotha, waiting to be crucified.

Whatever the role, Gauguin always saw himself, and expected to be seen, as a rebel at war with the conventions of modern civilization. He was not the first, but he has certainly been the best known and most influential of those painters who chose a flight to the primitive: a flight backward in time to ancient barbarian ways, as well as a flight outward in space to surviving peoples not yet corrupted by the West.

Primitivism has become one of the driving forces in the development of 20th-century ideas. It can be traced in such different forms as Picasso's appropriation of African sculpture, D. H. Lawrence's attempt to revive the worship of Quetzalcoatl, Adolf Hitler's revival of the tribal mentality of the Teutonic forests. None of these people ever became a full-fledged primitive in daily life, of course; they were using primitive forms and ideas for their own sophisticated artistic or political goals. Gauguin went further than any of them in trying to physically submerge himself in primitive society. He made three prolonged stays in Brittany between 1886 and 1895 because he saw in Brittany a traditional way of life that had not yet emerged from the Middle Ages. He spent a few months in Martinique in 1887 and discovered the "luxuriant and disordered nature" of the tropics. And his two voyages to Polynesia brought him "back to the dawn of humanity," to a land of "indolence and joy" where he could "live in ecstasy, in peace and in art."

As usual with Gauguin, there was a mixture of genuine emotion and pure bluff in all this. Yearning after savagery, he remained what Odilon Redon called a "refined savage," a product of 19th-century civilization, a learned, sensitive outsider. He loved traditional Brittany, but traditional Brittany would accept him

Still Life with Sunflowers on an Armchair is a late work, painted in 1901 in Tahiti just before Gauguin left for the Marquesas (seeds came from France).

State Hermitage Museum, Leningrad

Ohara Museum of Art, Kurashiki, Japan

Te Nave Nave Fenua (The Land of Sensuous Pleasures) is of a Tahitian Eve. The model is thought to be Gauguin's mistress Tehamana.

Albright-Knox Art Gallery, Buffalo

Manao Tupapau (Spirit of the Dead Watches over Her): famous canvas was inspired by Manet's well-known *Olympia.* Unpopular then, it is considered one of the artist's most important pictures.

only as a tourist. The parish priest indignantly refused his offer to hang his *Vision after the Sermon* in the local church. When he presented to his landlady Mme. Satre his portrait of her (*La Belle Angèle*), she was less interested in the daring color scheme and the Japanese-style composition than in the cowlike features he had given her, and she exclaimed "*Quelle horreur!*"

In Tahiti he might study the native language (he never learned to speak it correctly) and mingle with the native population more than the stuffier colonists approved; he might create a scandal by appearing in court wearing a pareu, the colorful native loincloth. He still remained European to the core. He acted like a beachcomber, but he might more properly be described as a remittance man. His life in Polynesia revolved around the periodic arrival of the mail boats that brought checks for the sale of paintings by his wife in Copenhagen, and his friends and dealers in Paris; that would also bring the latest literary and artistic journals, which he would devour to keep abreast of the progress of his reputation and the current state of cultural fashion in the rotten heart of Paris.

For beneath all the poses, all the turmoils, all the alcoholic and emotional binges, Gauguin was a professional artist, and a remarkably conscientious and hard-working one. Considering the way he moved around, and the difficult conditions under which he often had to work, his output is very impressive. He produced more than 400 oil paintings in a career of 30 years, and the oils represent only a part of his work. The new show does justice to the range and quality of his creations in other mediums, some of which he moved almost single-handedly back into the realm of fine art.

"Gauguin will make a jewel out of it"

Gauguin, largely self-taught, worked with what he pleased. As a boy he loved to carve knife handles, and he later remembered an old lady who predicted that he would be a great sculptor. All his life he scraped and scratched at the furniture in whatever rooms he was living, creating riotous, sinuous forms. He carved decoration on beds, walking sticks (his last one, with its handle in the form of a phallus, was angrily destroyed by the gendarme who supervised the sale of his effects after his death), spoons, barrels, tree trunks, the wooden shoes he wore in Brittany. He painted fans, he painted plates. He and his disciples painted the walls and cupboards and even the windows of the boarding-house where he spent the winter of 1889. "Give it to Gauguin," said Odilon Redon to the workmen who were repairing his stove and had removed a sheet of iron. "He will make a jewel out of it."

Ceramic ware, when he took to making it, was initially utilitarian, decorated pots and vases for household use. He learned the complex techniques of firing, decorating, glazing, and soon became a master, producing hundreds of wildly original works—jugs in the form of his own head, Breton girls dancing around vases, barbaric idols. Picasso would do the same in the next century.

He brought his restless, inquisitive turn of mind to printmaking, an art that had just begun to revive from a long moribund period when it was used exclusively for copying original works. He tried his hand at everything—woodcuts, etchings, lithographs, monotypes; he turned traditional techniques upside down and helped establish the original print as one of the major forms of modern art.

Gauguin expected to make fortunes out of all these processes, just as he expected to be given a fortune by an inventor he had met at the International Exhibition of 1889, so that he could go and live like a prince on Madagascar. All these bubbles burst one after the other as he continued his roller-coaster ride between euphoria and despair. He could console himself with having won the admiration of the men he most admired, painters like van Gogh and Degas and Redon, poets like Mallarmé. But he could never reconcile himself to the way popular fame and monetary reward always eluded him. Still, in the face of all his disappointments, he could cheerfully maintain to Schuffenecker, "In art I am always right in the end."

The right to dare everything

Time has been on his side. He was right when he insisted to his skeptical wife that he was a great painter; right when he predicted to the wife of the saloon-keeper in Arles, "Madame Ginoux, Madame Ginoux, your portrait will hang in the Louvre in Paris." (Well, essentially right: the painting today is in the collection of the Pushkin Museum in Moscow.) He was right, too, when he boasted that he had "wanted to establish the right to dare everything" for generations to come; that he had taught the young painters of the 20th century there were no limits—in art anything could be tried.

Art historians today give him credit for having been the first to set free form and color to act on their own as expressions of thought and emotion without being bound to the strict representation of visual nature. Once set free, they could be used to tap the irrational, instinctive substrata of the human mind, just the region where most post-Gauguin art has chosen to dwell. A newspaper review of which Gauguin approved—and when he approved, it usually meant that he had suggested the ideas and perhaps the language to the reviewer—observed that he worked "on the wavering threshold of the conscious and the unconscious." At this threshold, in a painting like *Vision after the Ser-*

Musée d'Orsay

Gauguin carved this elegant Buddha with Polynesian head in Tahiti. He worked as a sculptor all his life.

mon, he could make the real and the imaginary coexist. Everything in the painting seems brutally direct, but a film of uncertainty floats over it. Which is more real: the flesh-and-blood women stiff and immobile like prehistoric goddesses, or the imaginary wrestlers, copied in a lifelike pose from a drawing by Hokusai?

This blending of the real and the unreal is the stuff of dreams, and Gauguin is one of the great dreamers of the arts. His friend van Gogh did not at all approve. When Gauguin sent him his self-portrait as *Christ in the Garden of Olives* and Emile Bernard coincidentally sent him a painting of the same scene with Judas Iscariot wearing Gauguin's face, Vincent objected to the overt religious symbolism. If you want to show agony in the Garden, he said, paint some real workers in a real olive grove down here ("friend Bernard," he sniffed, "has probably never seen an olive tree in his life") and let the spiritual message rise out of the physical density of observed life.

Gauguin, on the other hand, was a thoroughgoing romantic, ever ready to set himself adrift on a sea of symbols. Fortunately for himself, he found in the South Seas an ideal ground where he could mingle his vision of external nature with his private fantasies.

The Polynesia he painted looks as physically real as the photographs in a tourist brochure, with its palms and mangoes and golden-skinned vahines. At the same time, it is a dreamland where he stakes out the claims of the unfettered primitive imagination against the humdrum realities of civilization. There is nothing here of the quotidian Tahiti and Hivaoa, where he dulled the torments of his ulcerated legs with morphine; where he wrote scurrilous newspaper articles about colonial officials; where, as he wrote his friend Seguin, "my 15-year-old bride Pahura cooks my humble fare daily and gets down on her back every time I ask her to, all for a ten-franc dress every few months."

Recalling the old Tahitian myths

When he wrote *Noa Noa,* a rhapsodical account of his life on Tahiti in the style of popular romantic novels, he preferred to remember another bride, 13 years old, this one: "the gold of Tehura's face flooded the interior of our hut and the landscape round about with joy and light. . . . We lived, both of us, in perfect simplicity." It was Tehura, he said, who recounted to him the myths of the old Tahitian gods that he used as background in so many of his paintings. It would have been more accurate to say that he copied them out of an old book he had got hold of. The old gods were long forgotten by the time Gauguin reached the islands and there were no physical remains of their cult, no statues. Never mind; he created statues of his own, Buddhas with Polynesian faces, and painted them in

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lush landscapes surrounded by worshipers in poses derived from the monument of Borobudur in Java, photographs of which he had acquired in Paris in 1889. When he painted the girls in the park in Papeete, waiting for the sailors to come in, he put them in the rigidly elegant poses of women on Egyptian wall paintings of the Old Kingdom.

Gauguin loved the blinding light of the tropics—"the air on fire but softened, silent"—which blurs outlines and confuses distances, a bright shimmering mesh of vegetation through which drift members of a golden-skinned, vacant-eyed race, wrapped in some kind of postcoital melancholy, seductive and distant and vaguely disquieting. These are dream scenes and, as in dreams, they are full of more or less obscure symbols. A considerable literature has grown up to explain what Gauguin meant by these symbols, and sometimes they seem plain enough. It is hard not to see in *Sunflowers on an Armchair* (p. 64) a memory of the dying Gauguin turning back to the warmth and promise of his days with van Gogh in Arles. He always maintained that the sunflower paintings were Vincent's best. But unlike the triumphant, blazing yellow of Vincent's flowers, his own are brown and wilted.

But what is the meaning of the disembodied eye up above the flowers? And the woman glaring through the window (or out of the picture frame) at the right? Does the lizard with red wings, fluttering at the ear of the Tahitian Eve (p. 64), stand for the Western sense of sin imported into the sexually permissive society of Polynesia by the missionaries Gauguin despised? In *Contes Barbares*, does the gnomelike, clawed-foot figure of Meyer de Haan appear beside two naked Marquesan beauties in Buddhist poses to represent the conflict of East and West for the Polynesian soul? Are the two bonneted figures on pale horses (at right) heralds of death, come to interrupt the carefree galloping of the *Riders on the Beach*?

The commentators have debated such questions, but the questions are hardly important. People do not look at Gauguin to study his private mythology any more than they read *The Rime of the Ancient Mariner* for the pious moral tacked onto it. Like Coleridge's albatross and phantom ship and frozen seas, Gauguin filled his canvases with presences in a realm beyond precise meaning. He wanted them, he said, to "make one think the way music makes one think without the help of ideas or images, simply by the mysterious affinities between our brains and such arrangements of colors and lines."

Private collection

Elegiac *Riders on the Beach* was done year before Gauguin died. Pair on pale horses may be spirit figures.

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Roads

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By P. F. Kluge

A diamond as big as the Ritz—well, just about that big

F. Scott Fitzgerald's title may be hyperbole, but here is the story of a gem that in real life became the second biggest in the world

The diamond in the rough: this is how it looked at 890 carats, before the sawing and cutting began.

It didn't look like much, this oddly shaped, taffy-colored stone. If you came across it while strolling on a beach, you'd pass it by, for it is too lumpy to send skimming over water, too jagged to clench in your fist during a fight, and there's nothing in its color—the muted yellow of a lollipop—to make you want to bring it home. You'd pass it by. Other men have sharper eyes. One of these men—his name and nationality still undisclosed—picked the stone up and kept it, thus becoming the discoverer of an 890-carat diamond, fourth largest ever found.

Another sharp-eyed man is the diamond's "maker," Marvin Samuels (p. 82), a fiftyish New Yorker who, in the early months of 1985, found himself confronting the chance, and the challenge, of a lifetime: transforming the 890-carat rough diamond into the largest finished diamond on Earth, 531 carats, nearly 1 carat larger than the Cullinan I, known also as the Great Star of Africa. The number will preoccupy Marvin Samuels for the next two years: 531 carats, a dream, a nightmare. 531.

It began as a rumor and the rumor was that someone had turned up a 900-carat gem-quality diamond. It was a rumor that Marvin Samuels did not believe. The gem trade is beset with accounts of great diamonds that, on inspection, turn out to be not great, or not diamonds. But Samuels—a lively man with a confidence that stops just short of cockiness—is a diamond professional, and one of the things he likes about his profession is that it confronts him with a series of challenges, each challenge unique, no stone the same. He doesn't just accept challenges. He seeks them out. He travels in search of them, travels often, travels light, keeping changes of clothes in Antwerp and London. Three times he flew to Europe searching for a diamond which, if it existed, would be the biggest find since the mighty Cullinan, 3,106 carats, source of the Great Star of Africa. At the time, the diamond was said to be on the open market, outside the hands of the De Beers company, which markets about 85 percent of the world's gem diamonds. Marvin Samuels still isn't sure why the diamond eluded him. "It slipped out," he says of one failed expedition to Europe. Samuels was undaunted. With the Zale Corporation, a large Dallas-based jewelry retailer, as partner, he finally bought the stone in August 1984. And now, while the 530.2-carat Cullinan I reposes with the other Crown Jewels in the Tower of London, its first challenger in 80 years sits on Marvin Samuels' desk at Premier Gem Corporation in New York. And Samuels, aiming at a "diamond that

The first cut is made by special saw in Jacques Swaab's factory. A copper blade embedded with minute diamond particles bites into the stone, sawing along the guidelines drawn on it with India ink.

will go down in history," is understandably ebullient.

Look at the diamond closely now, study it the way Marvin Samuels has already been pondering it for several months, marking and cutting plastic models by the dozen while the original was on display at the Smithsonian. Already the diamond is part of him. You can see it happen, the merging of man and object, each working on the other, responding, resisting, a courtship and a marriage.

"It's a fascinating business," Samuels reflects. "Very few people can take a rough stone, understand where it came from and how to get the best out of it. It's a challenge to take a rough diamond and make it polished. There are considerations of variety, color, shape and make. Every diamond is a battle, a project in itself, whether it's 1 carat or 900."

While the stone was at the Smithsonian, it was studied by John Sampson White, curator-in-charge of the Institution's mineral and gem collection. "I loved the crystal," he says. "I'd never seen anything like it before. Crystals tend to be fairly uniform all the way around. This one combined a lot of different elements." Some of his colleagues hoped it would be left uncut—the largest extant diamond in the rough. White did not share that opinion. He was eager for it to be cut. He saw the challenge, the mystery, and wanted the potential of the stone to be fully realized.

Samuels' predecessor, Joseph Asscher, studied the Cullinan for six months, 80 years ago. He decided to cleave the stone in two pieces. When he hit the hammer that split the stone, he reportedly collapsed on the floor in a faint. Now Marvin Samuels eyes his stone with a comparable intensity. What he sees is a lumpy mass. A few smooth surfaces afford a glimpse into the yellowish interior, which seems blessedly free of the foreign bodies—inclusions—that could degrade the diamond and, by themselves, dictate the course of cutting. So far, so good. But most of the surface is terribly rough, pitted with knobs and holes and cracks. And the basic shape of the diamond is problematic also:

Photographs by Lee Boltin

Table, or largest facet, was created by the first cut; the lines are saw marks, which were later polished out.

narrow at one end, bulky at the other, sunken and pitted on one side, ridged on the other. Nothing seems obvious. How do you begin?

"You let the diamond lead you," Samuels declares. "Never forget the diamond. It leads you. You let it lead you to what it has to be—a pear shape, an oval, extra facets. You can't fight the direction of a diamond. It's born. You go for size, weight and quality. Once you do that, once you solve those problems, the diamond will lead you. You'll see it. The diamond will form itself and that's what will be."

And now it begins, what will turn out to be a three-year match between man and stone. It begins gingerly. Decisions are nibbled at, reduced and delayed to avoid premature commitment or irreversible harm. "Pussy-footing around," Samuels calls it. Each step is as slow and small as possible.

"This is the time of 'pareve' cut," Samuels says. "You know how kosher food is classified? There's meat and dairy, right? And then there are some things—an apple, for instance—that are neither. That's pareve. That's what we're taking off the diamond now."

Samuels' first decision is not a matter of what or where, but how. He elects to saw as much of the diamond as possible. Sawing, in which a copper blade embedded with minute diamond particles cuts into the stone, is faster than "cutting"—grinding, actually—in which the diamond is pressed against a steel wheel covered with diamond dust. (Cleaving, with which Joseph Asscher split the Cullinan, is now used less frequently.) More important, sawing produces salable pieces, satellite diamonds, while grinding leaves nothing but dust. "You can saw it," Samuels says, "or you can breathe it."

To saw his diamond, Samuels chooses an old friend, Jacques Swaab, whose factory is a half-block away, in the heart of Manhattan's 47th Street diamond district. The transfer from Samuels' Fifth Avenue offices is disarmingly simple. Samuels drops the 890-carat diamond into a plastic Baggie, puts the bag in his pocket, and joins one of his sons—three of them are in the business with him—and a bodyguard for a stroll down the street where Sir Laurence Olivier came to grief in the film *Marathon Man.*

Dapper, low-key Jacques Swaab has made special arrangements for the outsize stone. His main workroom is crowded with long banks of diamond saws, 300 in all, 30 to a man, but these hold diamonds up to 15 carats. For Samuels' diamond, Swaab reserves an alcove at the rear of his workroom and there he installs a specially designed extra-large saw that will accommo-

P. F. Kluge spent three years working on this story. He'll miss the diamond, but he is now busy with his own project, carefully polishing his fifth novel.

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Before he begins "cutting" (grinding, actually), Hy Kessler studies the diamond through a loupe.

Kessler's hand lowers stone to a wheel, which is running at 3,000 rpm and coated with diamond dust.

date and—he hopes—protect the stone. While the diamond sits in a grip, encased in plaster, a saw cuts into it at 3,000 revolutions per minute. Computers give constant temperature readings, alarms are set to warn of sudden changes.

"A real fantastic diamond"—that's what Swaab saw when he first glimpsed the big stone. He also saw big problems that could turn one of Samuels' pareve cuts into a life-or-death proposition. The main problem was the diamond's irregular shape and rough surface configuration. Many diamonds are simple octahedrons whose transformation into finished stones is relatively routine for an experienced cutter. But this diamond is more complex, with its partly cleaved, partly crinkled surface, and its slight concavity on the back side. The grain orientation of such a stone is unorthodox and defies an obvious solution. "I have seen diamonds shatter like a piece of glass you heat and put in water," Swaab says. "I have seen diamonds with a million cracks. And there's no insurance for this. These things happen."

As he begins the first sawing—a 70-carat ridge over the area that Samuels designates as the diamond's table (largest facet)—Swaab carefully considers the density of the stone, the speed of the saw, the size of diamond particles on the cutting edge, the weight of the blade. The essential thing is to get, and hold, the blade on course. If the blade deviates it slows; if it deviates further it stops. And sometimes, Swaab says, there are stresses, slight imperfections that heat up as the saw approaches, generating pressure that can crack the stone. There can be sudden shifts in the diamond's grain—the equivalent of air turbulence—that send the saw in the wrong direction, following the path of least resistance: "The diamond will tell the saw which way to go, not the saw the diamond." What he watches for, more than anything, is heat. Heat is a sign of trouble. Heat *is* trouble. Heat is a fever in the stone, and the more the angle deviates from that allowed by the grain, the greater the heat.

"We're sawing at some almost impossible angles," Swaab says. "We're at the edge of what is physically possible. We're sawing at angles that have never been sawn before. I'm glad this diamond's here. And I'll be glad when it's gone."

While Swaab saws, Samuels sits in his office, consult-

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ing with a fellow diamond man, Leon Kornbluth, a white-haired diamond mechanic whom Samuels esteems for his cautious approach. Kornbluth has been exploring the possibilities of a pear-shaped diamond—a high-bottomed pear, a low pear, a conventional pear, any kind of pear that will remove the surface flaws, the cavities and cracks, and still contain 531 carats.

What follows between Kornbluth and Samuels is a circular, tangled, back-and-forth conversation. They finger plastic models of the stone. They prod it, eye it, weigh it, sketch it. Sometimes they are brain surgeons; today they are phrenologists. They draw lines with India ink, wipe them off with alcohol. They worry about "committing the stone," which also means committing themselves. A conventional pear shape, symmetrically rounded, would require trimming a frightening number of carats off the stone's bulky end. That is a commitment Samuels resists. "I've got to sleep on it a lot more before I decide to do anything else," he declares, ending the meeting. Kornbluth takes the delay in stride; a careful man, he knows that "the only thing that gets bigger as you cut it is a hole."

Never forget it—531 carats

There will be many more such meetings, waiting for the diamond to show itself, for the moment when, from behind all the immediate concerns, some ideal shape emerges, flawless, symmetrical and—never forget it—531 carats. That indelible, nonnegotiable 531, and only one chance to get it. That bothers Samuels.

"When I was in Florence, I visited Michelangelo's *David*," he recalls one afternoon. "A diamond has more value in a rough state than a piece of marble. Marble can be a floor, a table, an ashtray—or a *David*. Now we have a magnificent piece of diamond, one of the largest ever found, and I have only one shot at it. Michelangelo could find another piece of marble. Michelangelo could have another shot."

Designer, architect and proprietor of what he intends to make the world's largest finished diamond, Marvin Samuels was once a diamond cutter himself. But that was too many years ago for him to cut the stone now. "If a guy was a surgeon 20 years ago, even if he was the finest, would you let him cut on your body today?"

The man Samuels chooses to cut the diamond is Hy Kessler (p.76), a sharp-featured, pencil-mustached man whose careful manners and precise movements suggest he should be wearing operating-room green rather than factory blue. Samuels values Kessler's assurance and decisiveness, qualities quickly apparent as the two men sit down to discuss the stone. Swaab's sawings, 13 in all, have removed a large part of the diamond's rough, natural surface: more than 200 carats. But Kessler quickly realizes that hard choices remain. "If this were a 10-carat stone, it would be a very simple diamond, ABC," Kessler says, "and it would be easy if I had a definite shape to go for and I knew that was it. But this we have to make up as we go along."

After half an hour of feisty chat—where's the table, what's the width, where's the girdle, where's the point—Kessler takes the stone back to his shop. After Kessler leaves, Marvin Samuels gives his side of what sounded like an equivocal conference.

"I've been living with this stone," he says. "I know where I'm going. He's groping. In a short period of time he'll be ahead of me because he'll be living with it constantly. He was thinking normal. I'm thinking unorthodox. This stone has to be done differently. I don't think this should be an orthodox cut, like a pear shape. It should be different. It's big, it has fantastic color. Why shouldn't it be unique in every way? It will be sold to a unique individual, not just because he has money to burn, but because he wants to collect unique items. He's a collector. And I deal with unique people.

After sawing, the diamond stands surrounded by satellites—fragments that were created by the process.

All have since been made into smaller finished gems. "Cutting" of the big stone has not yet begun.

They always ask, 'Do you have something exciting?' "

The shape that Samuels now envisions is a "modified kite," modified because one of the kite's shoulders will be humped to pick up some of the carats at the back of the stone. The shape is a compromise, a deal between Samuels and the stone, between his insistence on 531 carats and the realities of the stone's irregular shape and surface. Now the question is whether the deal will work.

The diamond cutter's workroom is a small, cluttered place, fluorescent-lit and windowless. "I have to ask what the weather is before I go out at night," Hy Kessler complains. At work, he resembles a disk jockey at a boondocks radio station. Like turntables, two steel wheels covered with oil and diamond dust revolve in front of him and, like phonograph needles, the diamonds he is cutting—grinding, in fact—are pressed against the steel. And after 40 years, Kessler has a keen ear for the music of the stone. He detects a "metallic" sound when the diamond is forcing itself; when a diamond is running well, he hears something like "a fire engine going down a street, that doesn't care about a red light."

Quietly confident, Kessler respects the big stone. But he isn't intimidated. It's as if his whole career has been leading toward this job. "I always felt I'd be a cut above the rest," he says. "I always had a feel for stones. I attempted everything they threw at me. What I did, I did with my heart. I started on small, round stones, moved to emerald cuts, pear shapes, marquises. I never attempted anything I thought I couldn't do."

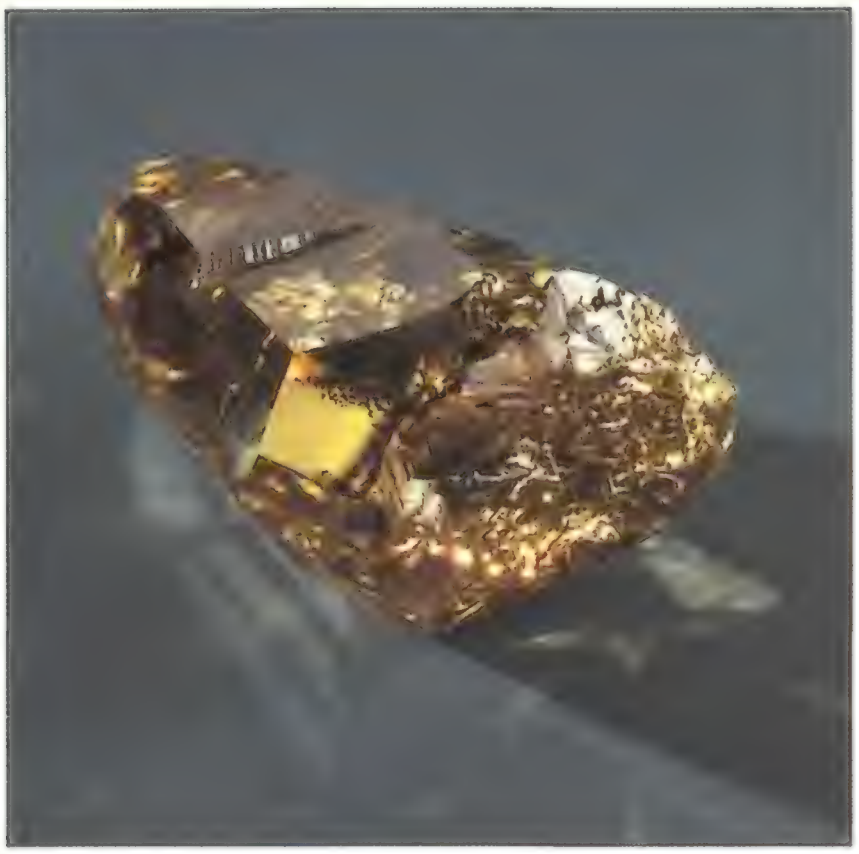
It's a kind of cannibalism

Now the big diamond presses against his wheel. An oily metal belt surrounds the wheel, catching the dust that comes off the diamond, dust that Kessler retrieves and rubs onto the wheel so that what we are seeing is cannibalism: the stone is eating at itself. And, one suspects, it is eating at Kessler, his professional aplomb notwithstanding. Like many in the business, he is guarded about his work. "People know about this," he says. "They mention it. I just shrug my shoulders and say nothing." He hasn't told his wife about the stone. But, like it or not, his work follows him home. "I get up in the middle of the night," he says, "and I ask myself, am I going the right way? You can't work expensive stones without taking it home at night."

As the diamond's final shape emerges, so too does a sketch of Marvin Samuels, its creator. He is a hectically busy, vigorous man, tall, room-dominating. He can talk long distance, finger a gem, huddle with a customer and bite into a deli sandwich, almost simultaneously. He's a talkative, peppery man with pungent opinions about the countries where he buys stones and the people to whom he sells them. A suave, high-flying businessman, a transatlantic commuter, he seems a world apart from the 47th Street sellers of engagement rings, but he carries some of the street's style with him, and some of its sayings. *"Kosherer top, koshere left!"* he shouts into the phone at one point. "Kosher pot, kosher spoon!" And, closing a deal, he offers the diamond merchant's time-honored valediction: *"Mazl-brokhe."* "Luck and blessing."

Throughout the first year of presiding over the diamond, Samuels seemed like a man who, though wary about premature claims of victory, was nonetheless well in control of the stone. So much in control that it was easy to wonder whether he wasn't exaggerating risks in order to heighten the drama of an operation going right according to plan.

But as the second year of work begins, the operation takes a bad turn. Now the drama is real. By now the modified kite has been decided upon, the diamond's table has been established, facets are being cut along the girdle that runs around the middle of the stone.



The diamond is lying on its table facet; some of the other facets have also been cut and polished.

The trouble is that, with removal of the surface cracks and cavities, the still-incomplete diamond has been pared to an alarming 580 carats. "The air went out of the cushion," Samuels concedes. Now he stops work. He consults. He cuts more plastic models. He calculates weight, not in carats but in tenths of carats. And this is the choice he faces: Should he make a flawless diamond, "a diamond beyond criticism"? That would mean giving up on surpassing the Cullinan I, for such a perfect stone would weigh less than 531 carats, probably less than 500. Or—the other choice—should he make the best possible 531-carat diamond, a masterpiece with flaws, skin flaws, some rough natural surface at the end of the stone, and a "feather" (crack) floating beneath the table? Perfect diamond or biggest diamond? That's what it has come to. And, attempting to explain his thinking, he turns, whether for inspiration or ammunition, to the enemy camp: the Tower of London.

"I was in London with a partner of mine and he said he'd never seen the Crown Jewels," Samuels recalls. "I said, 'Let's go, you've got to go,' and we grabbed a taxi. It was wintertime and there wasn't much of a line. The Cullinan I is mounted in a scepter. It sits in a big cage and on four sides there's a walkway. You're about four feet away, and there are guards. If you stop, they move you along, so you just have five or ten seconds to take a look. You don't have a chance to inspect it. Who's gonna have the chutzpah to say, can I look at the diamond, can I put my glass on it? The most important thing is that it's number one."

So he has decided to go for size, Samuels says, because "nobody remembers number two." He will have "the largest polished diamond in the world, fabulous color, 'fancy' yellow, something that won't be seen again in my lifetime." As he talks, Samuels' enthusiasm mounts, as though what he's saying sounds especially right to him just now. "Beautiful, it'll be! Size, it'll be!" Then the mood breaks. You can see it happen: second thoughts arriving. "Can it be more beautiful? Not to the world. You won't see the difference between what I would do with it and what will be. Who'll see it? I'll see it."

The people he's spoken to argue on behalf of size, and Samuels doesn't disagree. How can he? He's the man who, from the beginning, pointed out that the difference between a sculptor—Michelangelo, say—and a diamond man—Marvin Samuels, for instance—was that Michelangelo didn't have to sell his statues by the pound. No, Samuels knows the value of size. Two months later—it's July 1986 now—he announces he's "definitely going for size and the diamond will definitely not be flawless." When September rolls around and the diamond is down to 534 carats, the question of how much further to go resurfaces. This time is different, though. Marvin Samuels is asking the question, not answering.

"This stone will be *sold*," he reasons. "It's not going to sit in a museum with our names on it. We're not rich enough to do that. So we're putting out feelers to potential customers. The diamond is at a stage where it can be discussed intelligently with a buyer of substance. What we can say is that this is one of the really unique diamonds produced in the last 80 years. It can be number one in the world or we can beautify it some more, even if it goes down to 505 carats. So now it's for you to say. . . ."

"An interesting, difficult project"

At the beginning, Samuels said that the diamond would lead him to its ultimate shape, but that was true only to a point. Now grudging, now obliging, the diamond has revealed much of itself to Samuels. But the last crucial whisper, it seems, it has been saving for its potential owner. A dispirited mood comes over Samuels and his cohorts. Artisans they are, possibly artists, but they are businessmen also and the customer is always right. So the diamond men go about their business. Jacques Swaab, who sawed the stone, ships his outsize sawing machine to Johannesburg to work on a 230-carat find. He remembers the big stone as "an interesting, difficult project" and he volunteers that, if it were up to him, he would bring the diamond further down, aiming for beauty, not size. Hy Kessler sits in his workshop. The air in the office is metallic. So is the

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Marvin Samuels holds the finished stone. He coined the term "triolette" to describe its unusual shape.

mood. "I did the best I could with what I had," Kessler says. He displays a whole drawerful of plastic models of the big stone; some show cuts he never made. Like Samuels, Kessler seems reconciled but not pleased. Neither one of them wants to believe that the three-year match is over.

Finally the word comes back. The possible customer indicates that the stone should be worked on some more. Cut facets into the rough area. Polish existing facets some more. Remove the feather under the table. Shape the stone. And forget about 531 carats. Forget about being the biggest diamond in the world.

Size and weight have lost, beauty and symmetry have triumphed. A delighted Hy Kessler goes back to work on the stone: in a matter of weeks, he has it down to 500 carats. "Now we're going to make this look like a diamond!" he exclaims. And, for Marvin Samuels, a weight—a 531-carat weight—has lifted. He's delighted with how things have turned out, he says, and he quickly marshals arguments on behalf of perfection. So what if it's the second-largest cut diamond in the world, he says. Size isn't everything. It's still the largest fancy-colored diamond in the world, and it's still the largest diamond ever offered to the public. "The Cullinan was found, given to the king, and that was it."

At first it seems the completion of the stone is a matter of a few dozen carats, a few weeks' work. But the stone leads Samuels and Kessler further along, further into itself. Now they have the freedom to follow—the third-biggest finished diamond is 312 carats—and they have time. They use plenty of both. It is early 1988 when Samuels finally decides that the campaign is over.

Now he walks back into a rear office and returns with a tired-looking maroon jewelry box, the sort a dear aunt might store a pet rhinestone in. He slips off an elastic band from around the faded box and presents the finished product. Then he leaves to take an urgent phone call. A moment ago he talked of the diamond's uniqueness, perfection, beauty, its unusual triangular, or "triolette," shape. Now he lets the diamond speak for itself.

Placed on its heavy end and seen from the front, the diamond's lines lead toward the huge table facet, which is like a porthole into realms of gold—a pool, with other gold diamonds down below, more of them revealing themselves at every turn. A glimpse of riches. Turning the stone slowly, you come to the back, or "keel," side of the diamond, which—Samuels thinks—is as appealing as the front: the long, lengthwise lines of a forest or a cathedral, tapering toward an upward point.

It's a subtler pleasure than expected, to hold and contemplate such a diamond, a pleasure that you feel not just in the palm of your hand or in your bewildered eyes, but in the mind as well, admiring this meeting of man and stone. How often can you say, with absolute conviction, that man has improved on nature? You keep looking, keep turning; the diamond draws you in, inviting slow, pleasant scrutiny of angles and excellences, depths and surfaces, facets and reflections. Take your time, it seems to say, take your pleasure. I'll be here. Forever.

The diamond is done: 407.43 carats.

It is not—not quite—the ending that was hoped for. But Samuels is very pleased. The diamond will speak for itself. "People will look at it with awe," he says. And some of this awe will surely remain with Samuels himself. "I lost a lot of nights' sleep on this stone," he reflects. "But when you do this, you've accomplished something in your own trade. You go down in history. You don't die and get forgotten about. I'd like to have another one, but I'd be fooling myself if I thought I'd be seeing another in my lifetime."

The diamond, shown about two times actual size, is set in a stand made to emphasize its sculptural qualities.

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By Jack Fincher

Let's hear it for the once-pesky weed from Russia

Long loathed by ranchers for its rambling depredations, the 'tumbling' tumbleweed is now proving both beautiful and useful

Way out west of the Pecos they take to heart the story of the farmer who makes his mule mind by whacking him on the head with a two-by-four. "That makes him mind?" the city slicker invariably asks. "Nope," the farmer always replies. "But first you got to get his attention."

Getting the world's attention is a problem in Dell City, Texas. Why, almost nobody knows it holds its annual golf tournament in a dry lake bed so hardpan they gave up trying to dent it with holes and settled instead for chip shots into horizontal truck tires. You can hole out by hitting the side of a tire, but it costs you a stroke. Nothing comes easy in Dell City. Once, the lake bed filled up with rain—and residents rushed out to buy powerboats and water skis. A year later all the water had drained away, leaving the town's dreams of Arrowhead-by-the-Rio-Grande high and dry.

Getting the world's attention isn't necessarily a good thing, either. When state planners sought a site for the $4.4 billion U.S. superconducting super collider, Dell City's 600 boosters dealt themselves in, figuring they had plenty of room for a 53-mile-circumference particle accelerator. No thanks, came the government's back-of-the-hand reply, but how would they like a low-level radioactive-waste dump?

Tumbleweed sculptors Mary and Jim Lynch stand with their triple-deck creation in downtown Dell City.

Still, getting the world's attention is why Dell City has more or less adopted the Western tumbleweed, or Russian thistle (*Salsola iberica, kali* et al.) for its official flower. Credit Mary Louise Lynch, editor-publisher of the *Hudspeth County Herald and Dell Valley Review* for that. And give an assist to columnist-broadcaster Paul Harvey. Harvey got on the locals' good side in his column last year by comparing their paper's folksy blend of back-fence gossip, nuclear-disposal politics and green-chili recipes to that of the legendary William Allen White's Emporia, Kansas, *Gazette.*

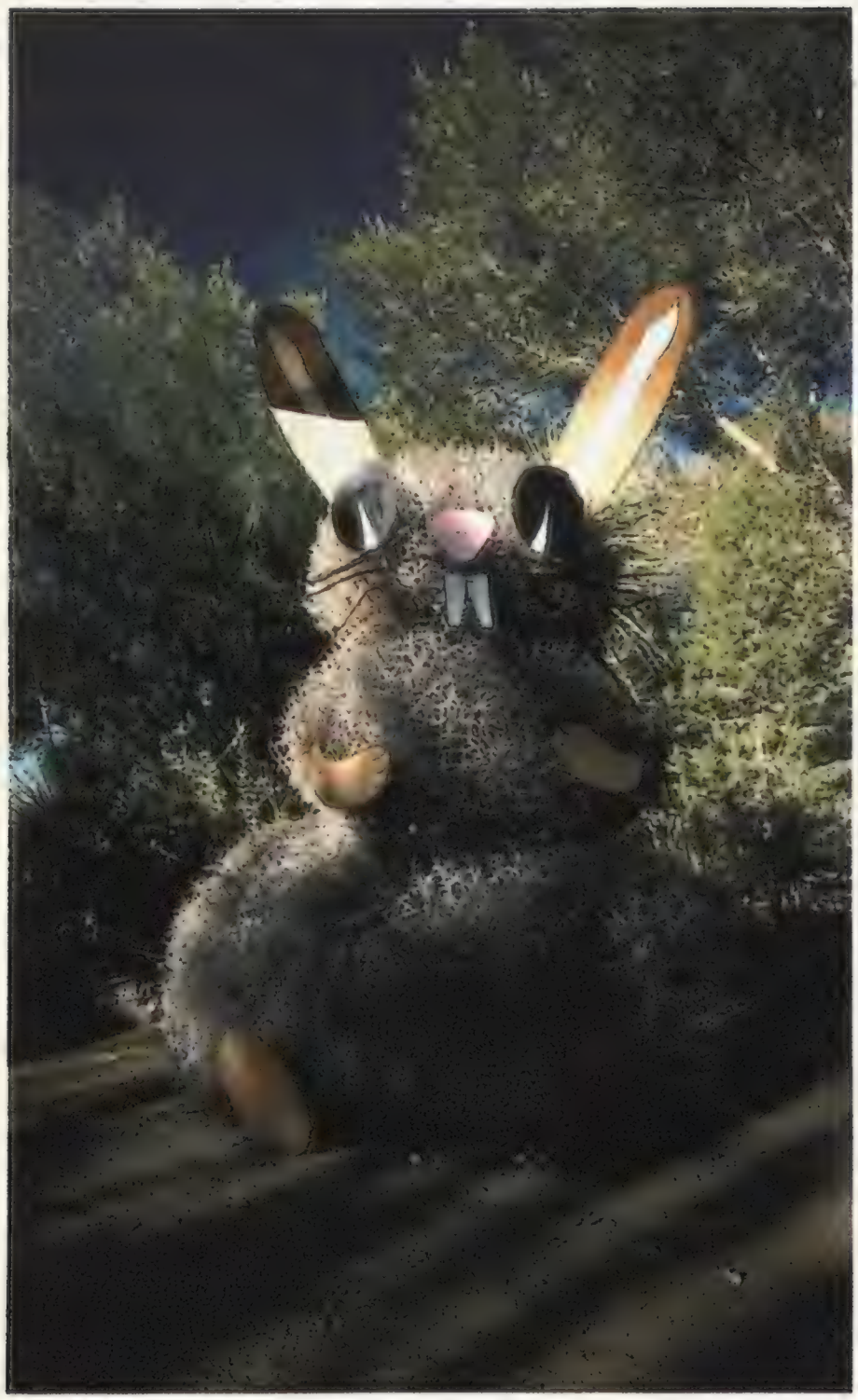
Then Harvey had to go and knock tumbleweeds. Mary Louise Lynch fired back a quick retort. Was he not aware you could make an ersatz snowman out of Russian thistle? Or an Easter bunny? Or a Halloween jack-o'-lantern? And didn't he know that researchers at New Mexico State were hard at work trying to insinuate *Salsola* into arid-lands agriculture as a promising forage crop and chemical feedstock?

Harvey had to concede that tumbleweeds have their

As if running away together, a pair of footloose tumbleweeds are blown down a lonely Texas road.

Photographs by Eduardo Fuss

Sprucing up the tumbleweed's image



Magnum opus for the Lynches, this 12-foot-tall Easter bunny helped popularize a tumbleweed tournament.

points. Next thing you know, Mary Louise Lynch is invited by National Public Radio to broadcast tips for tumbleweed Christmas decorations. Unfortunately, in all the excitement, neither NPR nor Dell City's first bona fide celebrity got around to telling listeners exactly where in Texas Dell City is.

It's on the map, all right, about an hour and a half east of El Paso. And unlike Gertrude Stein's Oakland, there's plenty of there there. But there isn't a whole lot more: a couple of paved streets, a handful of adobe houses and one-story wooden buildings—some of them quite nice and new, most of them not—huddled under a fringe of dusty, sparse and fruitless mulberry trees. Add a demolition derby's worth of abandoned automobile carcasses. And, of course, mile upon mile of mesquite, sagebrush, cactus, creosote, greasewood, goatherd, kochia and other woody, weedy denizens of the desert.

Most tumbleweeds have already left, pinwheeling out of town on the wind at an estimated ten miles an hour if you average out the barriers and baffles that retard but rarely stop their annual migration. Hitting the road is how they propagate. Once dry and free from roots innately structured to break, they bounce off and sail away from anything in their path, each one scattering up to 200,000 weedlets as it goes. Which is why farmers hate them. Sometimes they pile up and lean against fences until a breeze comes along to help them knock it down—and then they clamber over. Here and there they accumulate enough to block drifting soil and create impromptu bridges for escaping cattle. Which is why ranchers hate them.

With six-guns and a ten-gallon hat

Mary Louise Lynch comes out of her office to greet a visitor. She is a handsome, quietly enthusiastic woman with a smile panhandle-wide and hair as white as the gypsum-laden Guadalupe Mountains sand dunes looming in a blue haze on the horizon. "You missed it," she says, pointing streetward from the setback building. Sure enough, a ten-foot-tall tumbleweed sheriff with red bandanna, cutout six-guns, handlebar mustache and ten-gallon hat in sinister lampblack stands guard over the parking lot.

The Lynches came to Dell City from the San Joaquin Valley 37 years ago after rigs drilled Hudspeth County for oil and struck (wouldn't you know it?) water. Mary, her rancher husband, Jim, and three daughters (Linda, a New York City painter; Bonnie, a potter in Austin; Peggy, a science teacher in New Mexico) have been erecting tumbleweed sculptures for 15 years, using pruning shears, spray paint, cloth props, artificial "flocking" snow, cardboard, and concrete reinforcing rods. Last Christmas the idea finally caught on.

"The Chamber of Commerce sponsored a contest and gave prizes," Mary Louise recalls enthusiastically. "There were eight entries and it got pretty creative. Next year we hope to decorate the whole downtown." The news spread like, well, tumbleweed. She laughs, remembering. "We got a phone call from a man with a trucking company down in East Texas, asking if he could drive out and take a load back. Jim said, 'He needn't come this far to find them. What do you bet he doesn't make it?' He didn't."

It is Chamber luncheon day, so the Lynches and their guest adjourn to the Campfire Cafe for cold roast beef, iced tea and salad. When the subject of tumbleweed comes up, farmer Larry Brewton, sitting nearby, says, "To me they're nothin' but a nuisance. A bunch of 'em got into our chilies last year. You couldn't get 'em out. Had to harvest 'em right along with everything else, then separate 'em. Took twice as long. And there went the profit."

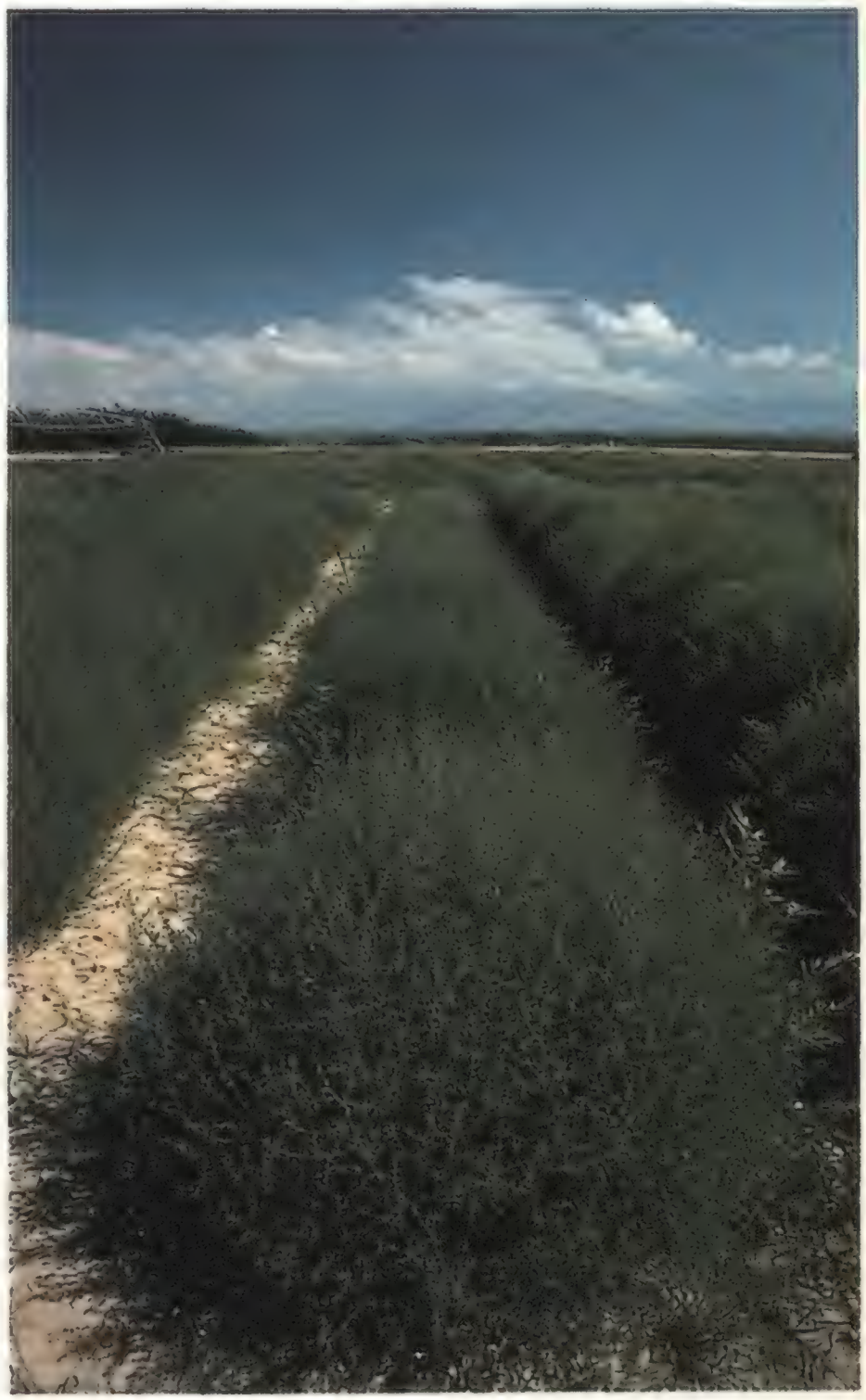
Jim Lynch admits that *Salsola* is something else. "Russian thistles are weeds with a difference. Leave the land in its natural state and you don't get them. Cultivate it and you do." At that, Dell City's former mayor, a wily woman named Merle Lutrick, offers a novel scheme for getting rid of them forever by marrying their potential to their perversity: "Just try to make a *crop* out of 'em," she says with humor as arid as all outdoors. "*Then* watch 'em disappear."

Indeed, "the weed that won the West," as James A. Young, a range scientist with the U.S. Department of Agriculture, calls it, has a history as nettlesome as it is long. Its seeds first infiltrated the United States only around a hundred years ago, stowaways aboard a sack of flax imported into South Dakota from Europe. Known as Tartar thistle on the Odessa steppes of southern Russia, the plant soon caught the attention of a USDA botanist named Lyster Hoxie Dewey, who strove to put this alien intruder categorically in its place. "The Russian thistle or Russian cactus is really neither a thistle nor a cactus," Dewey duly reported to his superiors in Washington. "It is a saltwort. Under any name, however, it is one of the worst weeds ever introduced. It will probably continue to be known as the Russian thistle until finally exterminated." Dream on, Dewey. Extinction was not in the cards. The Great Plains had a Tartar by the tail.

The tumbleweed raced north, south, east and west, hitching rides on boots, vests and petticoats, its germinating specks perniciously traveling in style by rail all the way to the Pacific coast. Everywhere it went it grew up to do the Devil's own work. Clogging and

The writer, who is a frequent contributor, grew up in the Southwest and admits he once harbored most of the standard prejudices against Salsola.

Biochemist Jim Hageman and agronomist Jim Fowler measure the photosynthesis rate in a test plant.



Set out in orderly rows, selected strains of the weed look as they'll look if *Salsola* becomes a cash crop.

breaking machinery. Lacerating and infecting the legs of horses with its cruel spines. Feeding and spreading prairie fires. Choking off food crops and driving out farmers in its insatiable appetite for more land.

Recommended one desperate state agriculture bulletin in 1895: "Place a Russian thistle in each schoolhouse, so that the pupils may become familiar with it." And then? "Teach them to kill it as they would kill a rattlesnake." A frustrated war correspondent for the Fargo, North Dakota, *Daily Argus* gasped in print: "The vanguard of the invader is already north of Sheldon. Oakes is given over to it, Lamore is gone with it. The streets are lined with it. The chinks of the sidewalks are fringed with it, the yards and vacant lots are matted with it." An ugly rumor rode the same radiating winds: Russian Mennonites from the Old Country had done the dirty deed to avenge religious persecution by angry locals. Foreshadowing the Cold War, a wheat farmer proposed a wire fence all across the state. But no use. Before the turn of the century the tumbling tumbleweed had drifted into every state west of the Mississippi, and some east, as well as across the borders into Mexico and Canada. And nobody gave a thought to making holiday sculptures of it.

Lost in all the rural hysteria was any realization that farmers and ranchers had largely been victimized by their own flawed and reckless practices. More land was being routinely turned than could be farmed. Excessive grazing further bared the earth to depredation. These grave oversights have since been remedied. So in a way it is true, as James Young points out, that the "Wind Witch" and its wicked spell forced budding American agriculture and early animal husbandry to clean up their acts.

Assorted tumbleweeds sprawl across New Mexico plain, show a wide range of colors in stem and calyx.

Equally lost, until recently, was the surprising fact that tumbleweeds aren't always bad! In the great drought of 1934, Kansas harvested hundreds of thousands of tons of thistle hay to keep its cattle alive. The message was unmistakable: in their nonsticker form (before flowering), tumbleweeds could both flourish and nourish when all living things about them were

The plants can be bred for starkly different characteristics, from the remarkably spiny (at left) to the practically spineless.

Some of the tumbleweed variants continue to develop;

The plant first immigrated to the United States from Europe in 1873 in a harmless-looking sack of flax.

spitting dust. Three years later, the skies over heat-stricken, tumbleweed-thick Saskatchewan, Canada, opened in a deluge that lasted for days. Suddenly, millions of parched acres exploded into some of the most succulent green forage imaginable. Clearly, in an emergency and given plenty of water, there's no telling how productive they can be.

But heavy irrigation is expensive. In the late 1970s, University of Arizona plant scientists began exploring the conversion of *Salsola* into biomass fuel. And lo and behold, when burned the filthy, footloose weed produced energy at a rate cost-comparable to that of lignite, a low-grade coal. By the use of existing techniques, they decided, Russian thistle could easily and cheaply be cultivated, harvested and pressed into logs, briquettes and pellets. Alas, the energy crisis waned and so did outside interest.

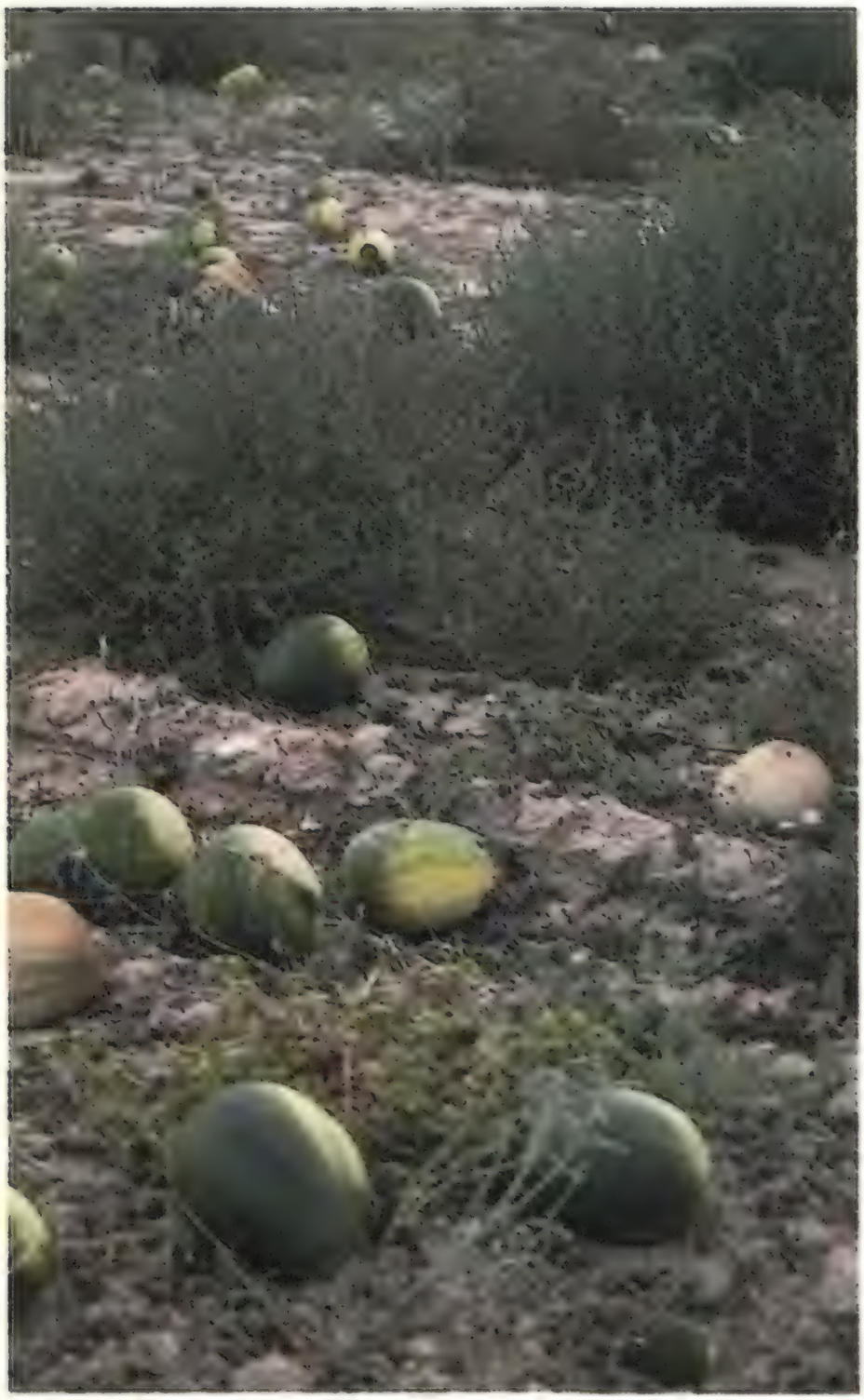
But the succulent green of Saskatchewan would not stay forgotten. In 1975, biochemist Jim Hageman went to Las Cruces and teamed up with Jim Fowler, a New Mexico state agronomist who had been deeply involved with research on the drip irrigation of cotton. Together they discovered something that farmers had forgotten: *Salsola* is not only highly productive but disease-resistant, too, and tolerant of drought, salt and harsh sunlight. Under favorable conditions, it uses only one-third to one-half the water that alfalfa does to produce a comparable yield. What's more, like your favorite breakfast cereal, it is passably rich in amino acids, protein, fiber, phosphorus and calcium, as well as nitrates and potassium.

Salsola had never been bred to optimize these desirable qualities. In this natural state, some varieties may contain oxalic acid and the potassium nitrate that makes it a good organic fertilizer. As a result, foul-flavored milk and scours might be the least of a dairyman's or a cattleman's troubles. Nevertheless, for every dire report there was another to contradict it. The most promising of them indicated that the tumbleweed's more odious attributes were weakly correlated genetically. That meant they might be bred out, presumably

they often produce petal-like calyxes in pink and red.

By the time the life cycle has been completed, the gray-brown weeds are dried out and nearly weightless, all ready to tumble in the wind.

Sprucing up the tumbleweed's image



Experiments are under way that involve melons planted beside the nourishing, nitrate-rich weed.

leaving a sweet stay-at-home softie with a heart of pure nourishment that someone besides Mary Louise Lynch could love. Hageman and Fowler decided to go for it.

Sources of funding, like the USDA, were dubious. In an era of farm surplus, did the world really need another forage crop? Hageman and Fowler argued that Third World desert areas could use *Salsola* to feed cattle and eventually, perhaps—with proper processing—people. For that matter, they contended, as water tables fall and energy costs cycle back up, a time could come when tumbleweed would be needed here in the United States as well. The New Mexico Water Resources Research Institute saw their point. It came through with grants totaling $115,000. So did the Plant Genetic Engineering Lab at New Mexico State University.

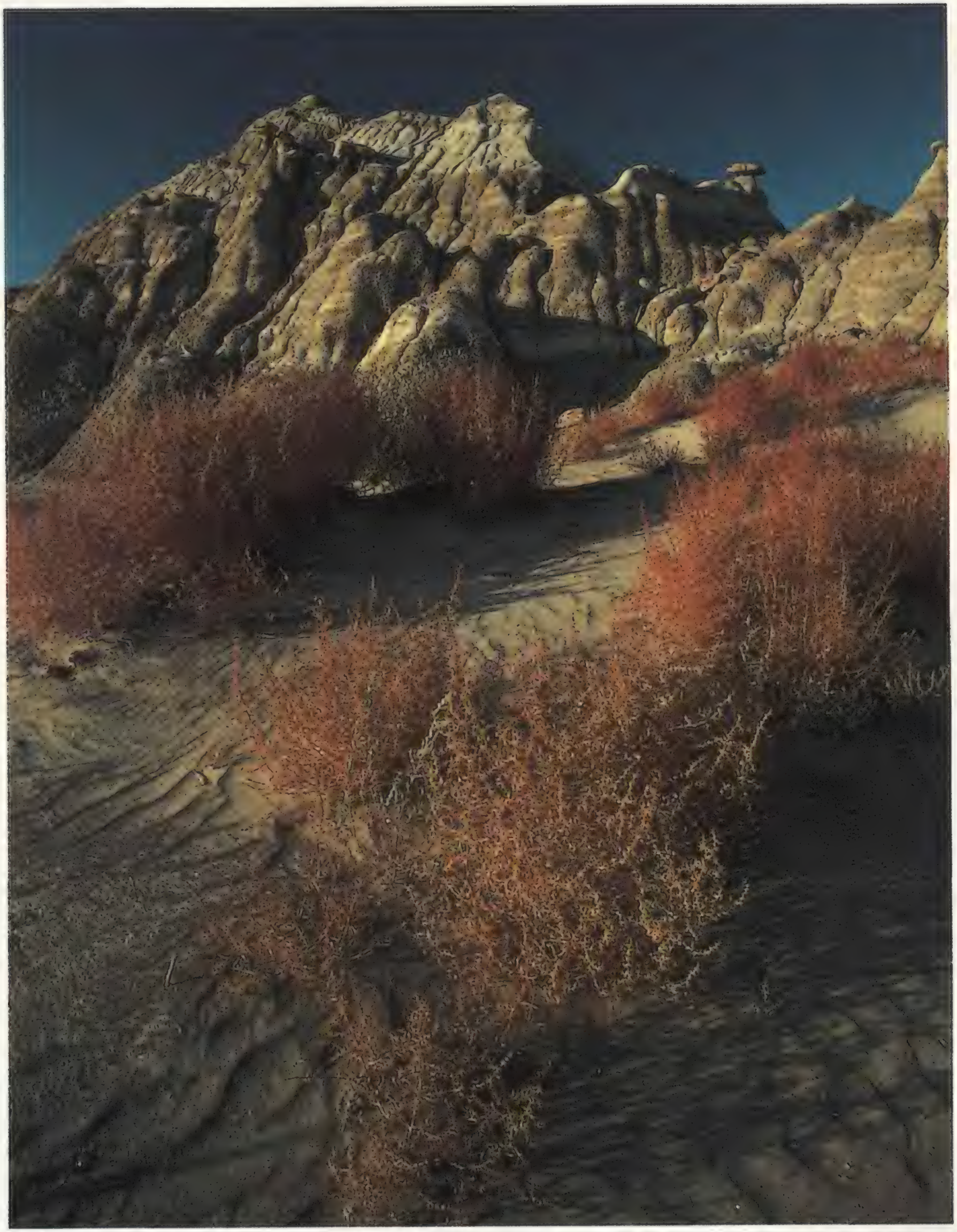
When they started trucking in specimens to be grown experimentally, one farmer phoned Hageman three times to complain about sinister goings-on. A colleague of Fowler's stopped him at the watercooler. "Jim, we need to talk," he said, his jaw set. "We're working at cross-purposes. You're trying to grow Russian thistle. I'm trying to kill it!"

After a dozen years of study, Hageman and Fowler have yet to produce a suitable hybrid, but they have selected out six different kinds, high in protein and low in nitrates, that could provide forage in the Southwest for eight months of the year. And they have learned much. For one thing, to beware *Salsola*'s frisky nature; wind and insects once went to work on different selections planted in closely spaced rows and the samples were soon promiscuously mixed. But both the natural rhythms of organized growing and the complex laboratory analyses have produced valuable and even surprising knowledge.

Not just salt-tolerant but salt-loving

Before blooming, *Salsola* is slightly higher in protein than alfalfa; after blooming, it's a quarter lower. By cutting it early, Fowler and Hageman got twice the protein previously reported. While alfalfa yields several growths of comparable nourishment value from the same planting, the repeated cutting of one stand of Russian thistle lowered its protein content. This suggests that regular replanting of the tumbleweed crop is the ultimate answer. In its use of water, the experimentally grown tumbleweed proved to be more efficient than anything Fowler has seen, with the exception of one uncommon millet.

The nitrate content of the experimental plants varied sixtyfold, moreover, but often decreased sharply when they matured. In the best samples it approached injurious levels only after the most prodigious applications of water and fertilizer. *Salsola* also proved not just salt-tolerant but salt-loving. "All available fresh



In Bisti wilderness area, orange-brown tumbleweeds live rooted in sand, with almost no water at all.

water on the surface of New Mexico has been appropriated, and the demand for subterranean deposits is expected to exceed supply by the year 2000," says Hageman. "But underground saline and brackish water is virtually limitless."

But what of the nearer future? Well, courtesy of the University of Arizona's "Arid Lands Newsletter," how about a nice bowl of cream of tumbleweed soup? Cook one pint of young plants in one pint of water till done. Add a pint of milk, thicken with two tablespoons of flour blended smoothly into one-quarter cup of cold water. Garnish with cheese and herbs. . . .

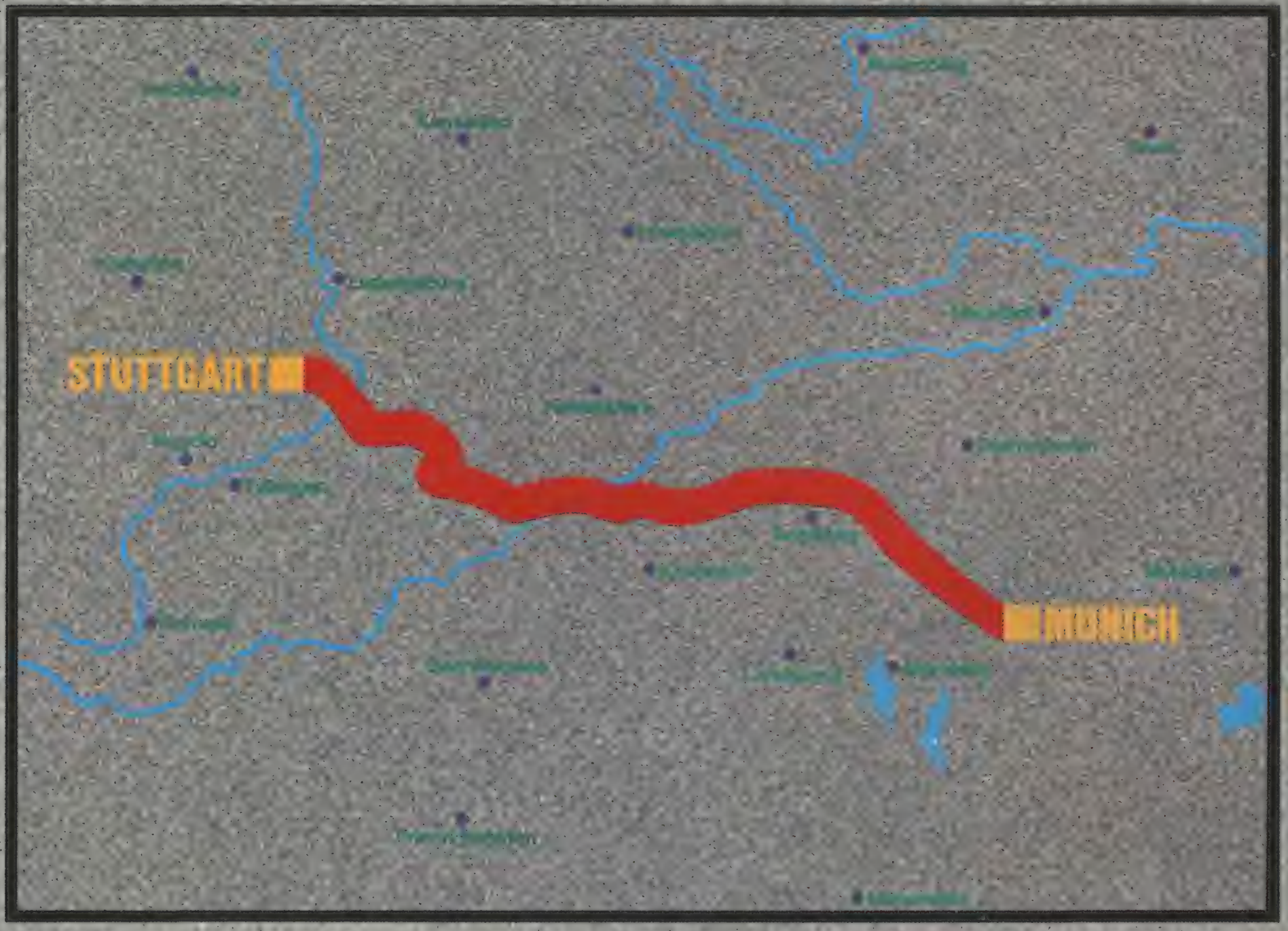
More seriously, New Mexico State University and a Western oil company are now negotiating a joint venture in which massive amounts of tumbleweed would be liquefied, the nutritive components extracted for food supplements, the other chemical contents drawn off and purified. Out of such a process, they think, could come a commercial bonanza: citric acid, vasodilators, antihypertensive drugs, fibers for pills and sanitary napkins, vitamins, food additives and drilling mud. In borrowing the meat-packing industry's philosophy of using everything but the squeal, they might even heat the factory by burning the leftover gunk.

In any case, the prospect has breathed new life—a projected $250,000 the first year—into the dreams Hageman and Fowler have of giving *Salsola* a just, if faintly seditious, legitimacy. And none too soon, either. In 1979 an International Arid Lands Conference on Plant Resources was held at Texas Tech University in Lubbock. Who was on the organizing committee? M.P. Petrov of Leningrad State University, that's who. Four years later, a Russian named Abdraimov reported work-in-progress to promote the growth of several species of the weed in the desert zone of Kazakhstan. Are the Russians stealing the march on us? Will there be a tumbleweed gap? No one is saying.

But today, in their lighter moments, Hageman and Fowler fantasize a future in which the Soviet Union, having seized the lead in the exotic technologies of sand culture and desert pasturing, pays for badly needed American wheat with equal tonnage of—*tumbleweed*? Dell City, Texas, and Mary Louise Lynch may have the last laugh after all.

Its cross-country progress blocked by barbed wire, tumbleweed hangs in the sun on a New Mexico fence. Sometimes masses of weed will pile against a fence, then catch a big wind that helps them knock it down.

THE TOUGHEST STRETCH FOR MOST GERMAN TOURING SEDANS ISN'T FROM STUTTGART TO MUNICH.



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But even with all this, some owners have admitted there is one activity they occasionally prefer to sitting behind the wheel of a Scorpio: sitting behind the *driver* of a Scorpio.

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For seminars, see page 193.

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By Charles N. Barnard

Along the corridors of marble: public pride, private grief

Arlington National Cemetery is so revered today that we often forget its beginnings as an act of revenge against Robert E. Lee

A light rain falls on the gray slate tablet that is inscribed "John Fitzgerald Kennedy." A group of Japanese tourists approaches under a huddle of umbrellas. Some pose in front of the grave; blinks from camera flashes reflect on wet stone. The tour leader recites through a small, portable amplifier. The name Kennedy obtrudes many times in the flow of jabbing Japanese. The visitors' eyes roam from the curling orange flame to the sweeping vista of the Potomac and Washington beyond.

Within the chains that enclose the grave site, one of Arlington Cemetery's maintenance men is crouched over the rough granite slabs that cover the President's resting place. Painstakingly, the man hand-shears the clumps of sedum that grow up in the spaces between the stones. He wears a bright yellow slicker; rain drips from the hood. He works slowly, picking up each handful of wet cuttings and putting them into a small plastic bucket.

I watch the Japanese group march away, then I consider the man with the shears. His seems a tedious, endless task. When he looks up at me, I say, "That could be done much quicker with one of those gasoline-powered weed-whackers, couldn't it?" The man smiles and nods.

It's always Memorial Day at Arlington, where visitors file through the expanse of headstones, row on row.

Members of the Pearl Harbor Survivors Association come to lay a commemorative wreath every December 7.

"S'pose so," he says, "but it just wouldn't seem right, would it?"

I recall, when I was a soldier in World War II, barracks bull sessions about all us GIs being eligible for burial one day at Arlington National Cemetery. I think many of us imagined that would be grand, a distinction we may not indeed have gloriously earned, but a unique entitlement all the same, one that would come, with others, at war's end. I now realize that none of us knew what we were talking about; we didn't know anything about Arlington, what it was, or perhaps even where. But we all somehow knew that burial in this greatest of military cemeteries was something special.

It is.

The assassinated Kennedys are there, both of them, and another President, William Howard Taft. So are astronauts and politicians and others, with military

Photographs by Cameron Davidson

service or relationships, who are better known to us in their careers as movie stars (Constance Bennett) and jurists and nurses and novelists (Dashiell Hammett and Mary Roberts Rinehart) and explorers and spies and journalists and a heavyweight boxing champion (Joe Louis) and even a president-in-exile of Poland (pianist Ignace Jan Paderewski). Also, in far greater numbers, are generals and admirals and military heroes of all branches of the armed services from every American war, Revolution to Vietnam. And so, in all, are more than 200,000 others.

So, now, this old soldier has finally come to Arlington—alive—and I walk around its winding roads and rolling Virginia hills in sun and snow and in the rain. The Kennedy graves are popular with tourists and draw large crowds, yet the engraved names of countless other famed Americans speak wordlessly to me from tombstones wherever I go. The epic, often tragic, always stirring story of our United States reaches out from marble and bronze to touch me more intimately here than in any history course I ever took.

"In honor of the United States Armed Forces who died during an attempt to rescue American hostages held in Iran. 25 April 1980 . . ."

"Virgil I. Grissom, Indiana, Lieutenant Colonel, US Air Force. January 27, 1967 . . ."

"F.R. (Dick) Scobee, Commander, Space Shuttle Challenger, January 28, 1986 . . ."

Every name, date and word carved in white marble is a muffled drumroll. Who dares not listen or not remember?

A spiritually cleansing retreat

Arlington is both a national cemetery and a national shrine. It will not sadden a visitor as much as it will uplift. It will be good for any citizen, a spiritually cleansing retreat for the soul, a therapy and prophylaxis for our times. Perhaps that is what John Kennedy meant when, nine months before he was murdered, he said at Arlington, "I could stay here forever."

Like JFK in 1963, every President since Woodrow Wilson has come to Arlington to lay a wreath at the Tomb of the Unknowns—"Here rests in honored glory an American soldier known but to God." It is a familiar ritual on Memorial Day at the white marble sarcophagus where now four unidentified Americans from two world wars, Korea and Vietnam are entombed.

These events make news photographs; those that do not are the more than 2,000 other wreath presentations made at the tomb every year—every day, even every half-hour in summer—modest wreaths and bouquets given by American Legion posts, Brownie troops, Sons of Italy, the Daughters of the American Revolution, labor unions, 4-H clubs.

An American flag is snapped open above a coffin, as a team prepares to fold it tight in exactly 90 seconds.

A caisson drawn by six white horses heads back to Fort Myer after a military funeral with full honors.

Children from across America come clothed in Sunday best, the boys in jackets and ties, the girls in trim dresses. I watch a towering, impeccable sergeant of the 3d U.S. Infantry, Old Guard, take aside two boys and two girls who will present the 11:30 A.M. wreath for their school. He tells them they are participating in a continuous ceremony that began in 1921. He explains what to do when it is their moment in front of the tomb, then he suggests (with a smile) that they try as best they can to execute a military-style about-face when they turn to leave.

The boys are sober, the girls giggle. Attempts to rehearse the about-face end in a tangle of feet. Then all share one boy's comb one last time. At 11:29:30, a big soldier leads four small kids out to do something their class has been planning for more than a year.

Arlington sees it all, every day

The wreaths and ribbons and flowers from Ohio and Arizona and Massachusetts stand briefly, alone, on their slim wire tripods, just at the spot where the President's great wreath always stands, and a bugler from the U.S. Army Band plays taps for each presentation, again and again, morning to evening.

Sgt. 1st Class Woodrow (Woody) English has been in the band for 11 years. I ask him what it is like to play taps six times a day. He says the number does not matter. "Every time I go out there, I try to remember what it was like to play taps at my dad's funeral, when I was just in high school. That's the way I play it here."

Shrine and cemetery, national pride and private grief—Arlington sees it all, every day. And if, indeed, fighting is the infantry's business, burying is the 3d Infantry's specialty. For the famed Old Guard, based at adjacent Fort Myer, Arlington is the stage on which this most elite outfit does its ceremonial best to make every death seem glorious. (A recent motion picture, *Gardens of Stone*, reenacted some of the rituals and dedication of the men of the Old Guard. Although fictional, and exaggerated at times, it is nonetheless a dramatic tribute to the 3d Infantry and Arlington.)

Four million visitors a year come to Arlington now (the number surged to more than eight million in the 12 months following JFK's burial here). It is second only to the Smithsonian museums among Washington's tourist attractions. If need be, it takes only minutes for the cemetery administration office to provide any visitor with the map location of any grave.

About half of the visitors take the 40-minute ride offered by the Tourmobile Sightseeing buses. They follow various routes along the cemetery's 15 miles of roads, always avoiding any funeral that may be in progress, but making three invariable stops: the Tomb of the Unknowns, the Kennedy grave sites and Arling-

Arlington's corridors of marble

Sgt. 1st Class Woodrow English has been playing taps for years, often six times a day at Arlington.

ton House, once the home of Robert E. Lee and now his memorial (SMITHSONIAN, October 1985). That's where the cemetery's story begins, really, with Lee and with the bitterness of the Civil War.

Seen from the nation's capital across the Potomac, Arlington House's distinctive, eight-column, Classical-Revival portico is a prominent landmark. It appears to be the guardian and custodian of the rows on rows of gravestones around it. Indeed, in a way it is, for if this grand house had not been built here in the early 1800s by George Washington's step-grandson, George Washington Parke Custis, then Arlington Cemetery would almost certainly not exist today.

In 1857, Custis died and left the house and 1,100-acre estate to his daughter, Mary, the wife of an Army officer, Robert E. Lee. In April 1861, with civil war imminent, Lee made the decision to resign his U.S. Army commission and take command of Virginia's secessionist military forces. He then left Arlington, "where my affection and attachments are more strongly placed than at any other place in the world," never to return. By the end of May, Union forces occupied the estate and it soon became a military headquarters for the defense of Washington.

In 1862, Congress decided to levy taxes "in the insurrectionary districts" and $92.07 was assessed on the Lee property. The family made an attempt to pay the tax through an emissary, but Union tax collectors refused to accept the money on the grounds that the property owner must appear in person. It was a transparent excuse intended to bring about confiscation of the estate for tax default—which it did.

Flowering dogwood at his feet

Pvt. William Christman of Company G, 67th Regiment, Pennsylvania Infantry, 20 years old, single, was the first soldier buried at Arlington. That was on May 13, 1864, near a small cemetery where estate slaves had been laid to rest over the years. The cause of Christman's death: peritonitis. His personal effects (including "1 pr trowsers, 1 pr socks, 2 flannel shirts, 1 knapsack, 1 canteen") were returned to his father.

I found Arlington's first military grave after a bit of searching. Forever-young Bill Christman lies with a flowering dogwood at his feet and surrounded by comrades on all sides. I can see no particular reason why more than a century of burying should have begun at this particular spot on this particular slope, yet here is where the gravedigger's shovel broke ground and where Arlington began.

Some thought it improper to use the estate for burials. The Quartermaster General of the Army, Montgomery Meigs, didn't agree. Lee was a traitor, in Meigs' view, and the property confiscated from his family did

The grave of Pvt. William Christman, first soldier to be buried at Arlington.

Students from Central Middle School in Columbus, Indiana, lay a wreath at the Tomb of the Unknowns, guided by Old Guardsman.

not qualify for any special considerations. By June 1864, with casualties mounting, Meigs proposed that Arlington be designated a military cemetery. Secretary of War Edwin Stanton agreed, and 200 acres around the mansion were appropriated for burials. This was understood to be an act of revenge, in effect making the Confederate commander's residence forever uninhabitable. Graves were soon placed within a few yards of the house and a huge vault to contain the remains of 2,111 unknown Union dead was constructed in the Lee rose garden.

Twelve years after hostilities ended, George Washington Custis Lee, the heir to the estate, took the U.S. Government to court in order to establish his rightful ownership of the Arlington property. Legal maneuvering took five years, with the case ending up in the U.S. Supreme Court—where Lee won.

Now the Government was in a jam. It had been declared a trespasser on Lee's lands and was told, in effect, to get out. But 16,000 soldiers lay buried around the old estate. To disinter that many would have been an unprecedented—and unthinkable—task. Negotiations seemed the only reasonable course. Lee demanded $150,000 for his property, and Congress had no choice. The money was appropriated in March 1883 and Arlington was left a national cemetery forever.

Throughout the Civil War, Confederate prisoners who died in Union hospitals were buried at Arlington, albeit often under the word "rebel." At war's end, many of them were taken back to their home states in the South, but 409 remained at Arlington.

In 1906, with the acrimony of war softened by time, Congress authorized a Confederate memorial at Arlington. Eight years later, on the birthday of Jefferson Davis, the monument was dedicated by Woodrow Wilson, and all remaining Confederate dead were reinterred around its base.

The man who administers today's burial arrangements is Thurman Higginbotham, a former "cemetery rep," who since 1965 has supervised more than 20,000 Arlington burials. A "rep" handles funeral arrangements for everyone from privates to Presidents.

"After JFK, it seemed everyone wanted to be buried here," he remembers. "Then came the Vietnam dead and suddenly we were burying 35 people a day, sometimes more. Something had to be done, or too soon there would be no more space."

Arlington Cemetery covers 612 acres, about three-quarters the area of Manhattan's Central Park. There is not much likelihood that any adjacent land can be acquired for further expansion. In order to conserve space, eligibility for burial on its grounds was changed by the Secretary of the Army in 1967. No longer, for example, could this old soldier consider being buried there—I do not have 20 years' active duty, a Purple Heart or other high military decoration, nor do I meet any of the new requirements. I could still, however, be cremated and inurned in the new 10,000-niche Arlington columbarium. About 15 percent of all Arlington funerals are now for cremated remains; the new struc-

Charles Barnard has been a free-lance writer for 18 years and is often on the go—either traveling or getting his private pilot's license.

An aerial view of the cemetery in late fall: grass is not at its best, but awaits resodding in spring.

ture will eventually expand to provide 50,000 niches.

Under the new rules, burials per day ("drops," in Arlington parlance) now average 15, and the time when the cemetery will reach capacity has been deferred to the year 2021. After that, its status will be that of a national shrine.

Superintendent Raymond J. Costanzo thinks that even then, ways will be found to keep Arlington an active cemetery. "I don't believe they'll ever let us close completely," he says, looking abstractedly out his office window. "There is land around here somewhere. I even look over there at the Pentagon and wonder if they really need all that space."

Costanzo has been in the Army cemetery service since 1948 and has done duty at several other major sites, but he says none can match Arlington's special qualities. "Even the tourists who visit us seem to take on an almost reverent demeanor." Arlington is strict on behavior and appearance. Skimpy clothing, skateboards, roller skates, bizarre getups, radios and picnics are forbidden.

Costanzo and Higginbotham agree that one quality that sets Arlington apart from any other U.S. military cemetery is the compulsive perfection with which honors are rendered whether for a private or a general, or even for their family members. It is, for one example, the only cemetery where horse-drawn caissons still contribute traditional pomp to the funeral cortege.

What makes a military burial with honors any different from one cemetery to another? I ask. "The 3d Infantry makes the difference here," answers Costanzo.

An hour-by-hour roster of the next-day burials and honors ceremonies is released each afternoon at 4. One of the people with an immediate need to know this information is Eugene H. Wilson, general foreman of field operations and a 30-year federal employee.

"When I get the list, we start planning tomorrow's digging," Wilson says. He has a full-time staff of 55. Their main responsibility is the opening and closing of graves, which is done these days with backhoes. The 3-foot-by-8-foot holes are dug at 5- or 7- or 9-foot depths, depending on how many family members will eventually occupy the vertical grave. "Tiered burials" have replaced side-by-side interments as another space-saving measure.

Wilson also oversees the mowing of the lawn (a never-ending task that is done by an outside contractor) and the trimming of grass around almost 175,000 headstones (yes, with weed-whackers). The headstones, with basic engraving, are supplied free by the Veterans Administration, although private monuments are found on about 20 percent of the graves.

Rain or shine, an eternal flame burns at President John F. Kennedy's grave—Arlington's most visited.

It must be said that although Arlington is both orderly and beautiful, it does not present the manicured appearance of American military cemeteries abroad. Its managers point to the fact that it is still an active site. Our cemeteries in France, with their white crosses row on row, are forever closed to burials.

As one walks the grounds, a force begins to be felt: the Tomb of the Unknowns is Arlington's lodestone. On the marble plaza in front of the tomb, on a 63-foot, black rubber mat, a 3d Infantry sentinel walks at a cadence of 90 steps per minute, back and forth, 21 steps in each direction, eyes straight ahead, M-14 rifle at shoulder arms, with black mourning strap and bayonet fixed. At the end of each 21 steps, the soldier pauses for 21 silent seconds, symbolic of a 21-gun salute, then shifts his rifle to the shoulder away from the tomb and walks 21 steps in the other direction. It is a synchronous, toy-soldier performance that takes months to learn and is not usually endured for longer than a year and a half before reassignment comes.

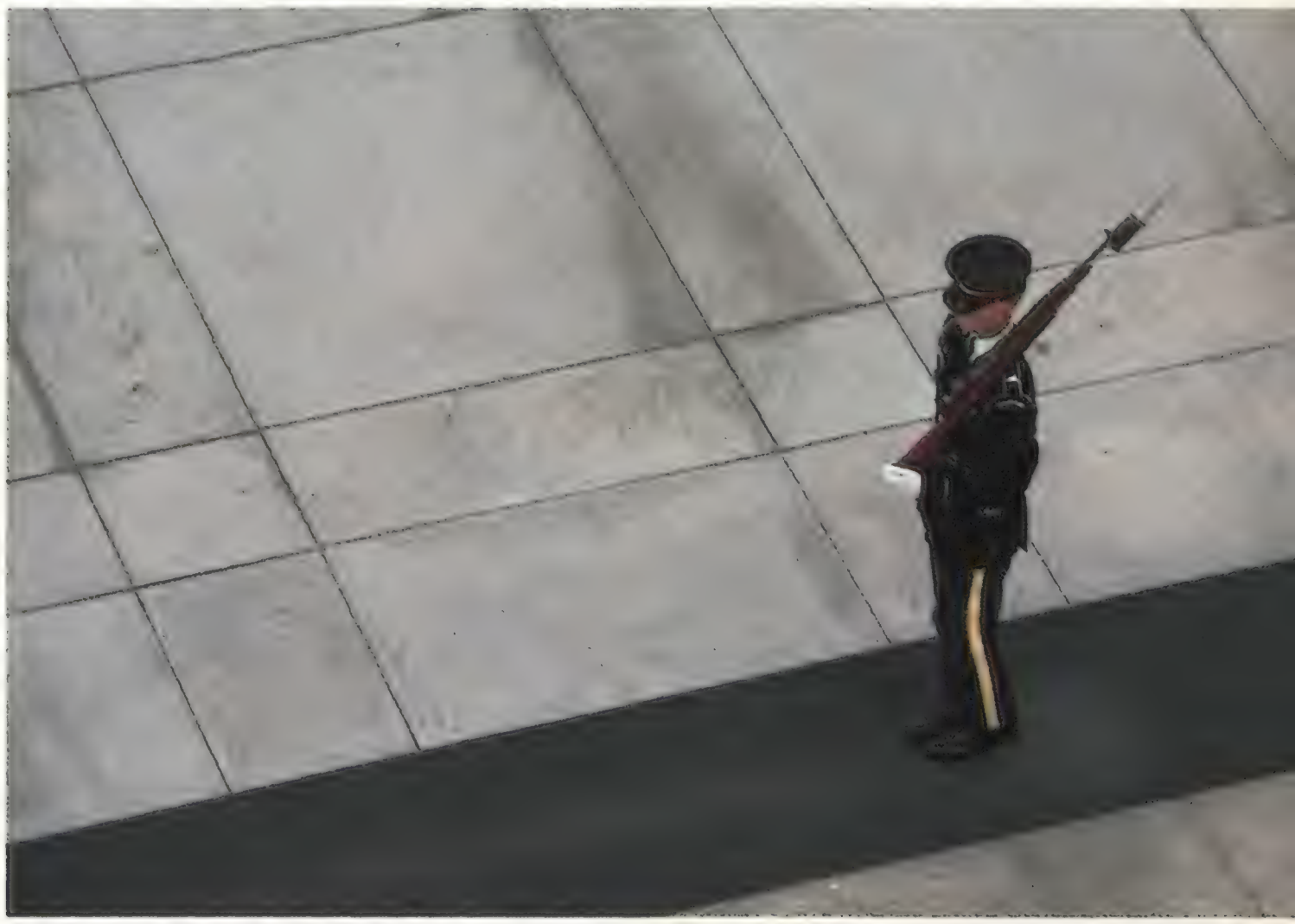
Is there a way out before that? One way, I was assured, is to drop a rifle. "You're automatically relieved of duty at the exact instant your weapon hits the ground," an Old Guardsman will tell you—and not with chagrin, but with pride.

Every hour in winter and every half-hour in summer, the guard is changed. A relief commander salutes the tomb and inspects the new sentinel (who wears white cotton gloves that have been soaked in water to assure a secure grip on his rifle). Orders are exchanged with the retiring sentinel. Then the smart crack of heels. Spectators watch each ceremony, hands on hearts or cameras poised.

This is done 365 days a year, in all seasons, in all weather. The men are all Old Guard volunteers. Some wear a sterling silver Tomb Guard badge, which will be a part of their uniform for the remainder of their Army career. I meet one of these men here, finally, in their subterranean quarters within a few feet of the crypt they protect with an oath of "eternal vigilance." We sit in a small recreation room with a pool table at the center—Sgt. Brett Gookin and this old soldier. I manage to say the wrong thing right away.

"You must get bored. . ."

"No, sir." Gookin is in his early 20s, a lean six feet four, and wears the military haircut called high-and-tight. "It's never boring, sir. The motivation comes from inside each man. That's how you get the uniform to look so perfect on you—it fits from the inside, you see, not the outside. A lot of people don't understand



Pvt. 1st Class John J. Ahearn III paces on a black rubber mat before the Tomb of the Unknowns, 21 steps in each direction.

that. We're not here for the glory. This is no fun. In summer, if you lay 20 wreaths in a day, that's work. But when one of those old veterans—like you, sir, if you'll pardon—when one of you says, 'You guys are great,' that's the reward."

Sgt. 1st Class Gregg Owens, standing nearby, says, "They call us parade-ground soldiers sometimes. That may be true during the day, but at night this becomes a real guard post and we switch from the dress blues to regular uniforms and protect our perimeter. It's no parade ground then. The tomb was defaced once, before we got here in 1926. That's why it's now an Army guard post. We can call in some mighty heavy support here if we ever need it."

For all its ceremonial perfection, the Old Guard also sees its duties at Arlington in a realistic way, prompted by the relentless schedule of burials. (Army burials represent about 30 percent; honors for Air Force, Navy, Coast Guard and Marine burials are rendered, in part, by ceremonial units from those services.)

I hear one procession approaching long before I can see it; the band is playing a hymn as it marches somewhere beyond the trees. The sound of drums echoes ahead, carrying down the corridors of marble; the notes from trumpets and horns waver sadly across the distance. From another direction, I hear the first firing of the Navy's minute gun, a 105-millimeter howitzer, which will mark every 60 seconds of this admiral's final journey from the Fort Myer Chapel to his grave. I see another procession moving slowly, led by the band in red caps, followed by a rifle platoon, then the colors, then another rifle platoon ahead of a horse-drawn caisson bearing a flag-covered casket and a general's red flag of rank.

The six-horse teams may be all black or all white. Three Old Guard riders are mounted, straight-backed, on the horses to the left; they lead or "pony" the horses to the right. A lone outrider, the noncommissioned officer in charge, is mounted on a seventh horse.

It is at graveside or at the columbarium that the men who render military honors are in the closest contact with grieving families. Whether they are Marines, Air Force, Navy—or the Old Guard at Army burials—all understand what they are repeatedly told: "That veteran's family will remember you and every move you make today as long as they live."

The casket is drawn from the caisson by these men in three measured pulls, then held momentarily at caisson height before being lowered and carried to the grave site. Immediately, the American flag is loosened from the casket and snapped open above it, taut as an awning, held by six or eight men wearing white gloves. There are a few words from a chaplain, a hymn, three rifle volleys and the playing of taps. Then, as the band plays *America the Beautiful*, comes the final folding of the colors.

Listen to former Old Guard Capt. James Parker: "It takes three months to train flag folding, and even then, new men are stationed in the middle where they have

Honor guard stands motionless in the falling snow for a wreath-laying ceremony on Veterans Day last fall.

less to do. As soon as taps is ended, the casket team leader makes an almost imperceptible tug on the flag. It is the signal for the fold man to begin. The process should be completed in 90 seconds because that's how long it takes to play the two choruses of *America the Beautiful.* In practice for flag folding, we tolerate a plus or minus of only 15 seconds."

At the end, the flag has become a triangle of blue, showing four stars on the long, straight edge: "A four-star flag," the Old Guard calls this. It must be tight, with crisp corners, and not a thread of red may show. This comes, eventually, into the hands of the officer in charge, whose duty it is to hand the flag to the next of kin with the familiar words, "This flag is presented on behalf of a grateful nation, as a token of appreciation for the honorable and faithful service rendered by your loved one."

Captain Parker says it must not sound memorized.

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Collapse of the roof of Kansas City's Kemper Arena in 1979 (at top right) was traced in part to the failure of six-inch-long steel bolts holding roof to exterior frame. Bolts could not stand repeated changes in load.

By Erik Larson

A new science can diagnose sick buildings—before they collapse

Above is the evidence: bolt at left is still straight; one at center is bent; one at right, completely cracked.

Many structures suffer from the stresses and strains that may lead to disaster, but 'building doctors' are taking their pulse

Ordinarily, there is nothing terribly interesting or secret about parking garages. But here in a brand-new garage somewhere in a city in the southeastern United States, secrecy is the order of the day. This garage, as yet unopened, is seriously ill. "You have to understand," says the project manager, sitting in his trailer office on the site, "we can't afford to have anyone think this building is anything less than perfect." He won't let me name the architect, the contractor, the owner, the city, the state; I can't even describe the architectural design of the accompanying office building. What I'm allowed to say is, this is a parking garage in a city in the Southeast. And that it's about as flawed as a cheap diamond.

Dick Muenow, standing nearby, is trying to keep a low profile, hoping that the project manager won't get mad at him, because he's already in a delicate position. A structural diagnostician, he brought the bad news. His examination turned up widespread faults in the concrete of this most-secret garage. In his gray corduroys and his fog-gray sweater, he has got the look of a country doctor, a roundish, aging GP right out of a Norman Rockwell painting. His boots are the giveaway: once shiny black, they are mud-caked and the color of creamed coffee.

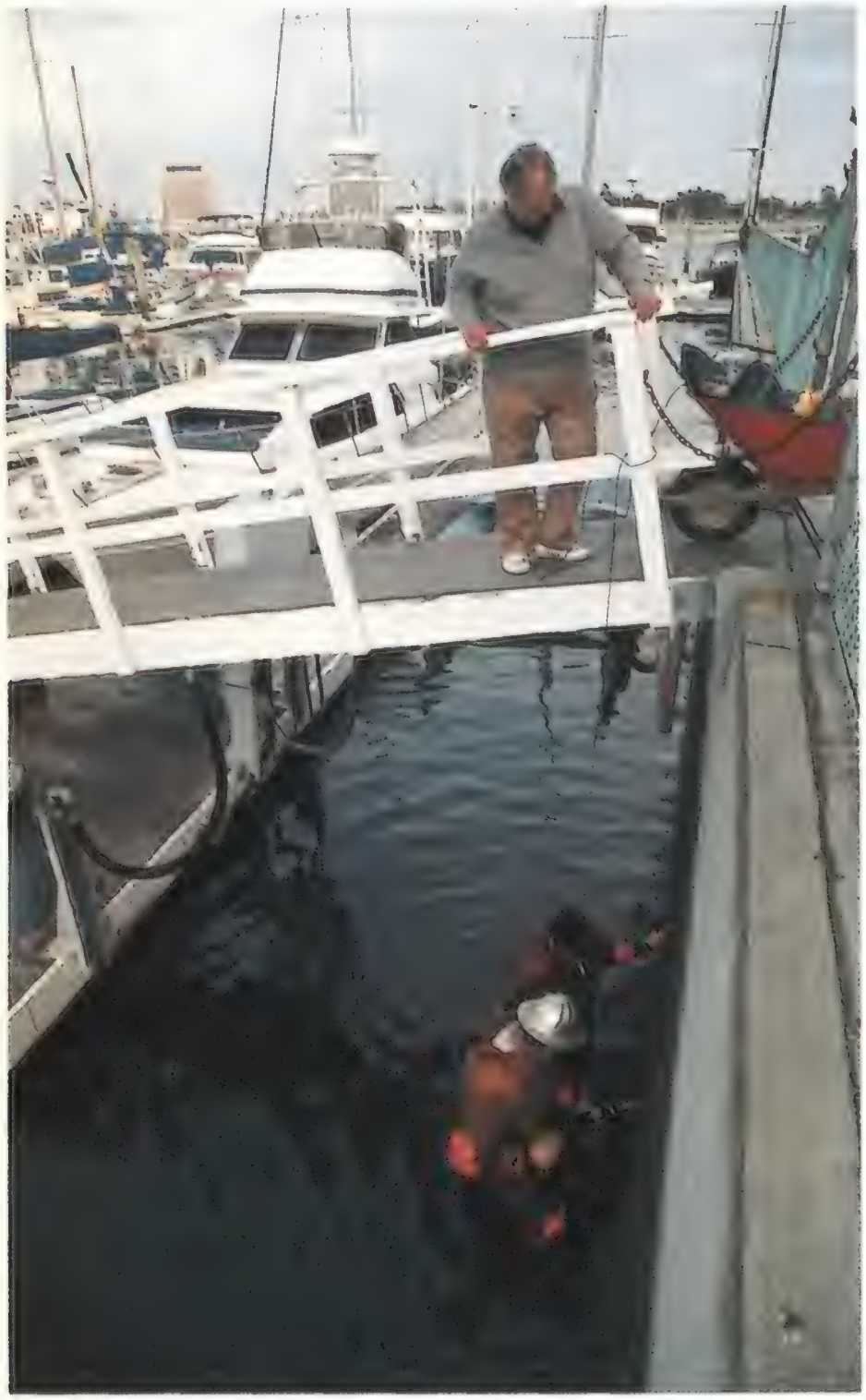
Outside in the crisp autumn air, Muenow tells me, "The one thing you learn the first five minutes you're in this business is nobody has a sense of humor."

Structures grow, shrink, shiver, breathe

There is a lot at stake when a building gets sick. Architects lose their reputations. Contractors get sued. Rents plummet. And, of course, people can die. What suffers most, perhaps, is that faith we all place in anything made of concrete and steel. The fact is, the building you live in or work in, the bridge you drive across each day, is a complex system, almost alive. The Cape Hatteras Lighthouse on North Carolina's Outer Banks leans away from the sun as much as eight one-hundredths of an inch, then straightens after dark. In cool weather, the huge steel cables of the Golden Gate Bridge contract, steepening slightly the arch in the bridge's central span. Structures grow, shrink, shiver, breathe. And may not be as solid as they look. Gauging the health of huge structures can be as complex as trying to find the cause of a man's illness; more complex, in some ways, considering that when buildings get sick they don't complain, and considering, too, their sheer size. It's one thing to do a routine physical on a 150-pound man. But what do you do with a 300-million-pound bridge?

Demand for building diagnosticians is now greater than ever. For one thing, new structures are far more innovative and complex, and the more complex, the

'Doctors' who examine sick buildings



Richard Muenow directs use of sound-wave detector on weak seawall, to scan induced shocks (opposite).

more likely they are to have flaws that need correction. Old structures, of course, need doctors too, especially now that the high costs of new construction make preservation and restoration much more attractive. Indeed, many of the country's most renowned structures are showing signs of wear and age, and need examinations to figure out what's worth saving and what isn't. The Statue of Liberty got one of the most thorough structural physicals ever (SMITHSONIAN, June 1986). A growing awareness of the dangers of earthquakes and of the complex effects of wind has likewise spurred the growth of diagnostics. "It used to be, you took a building on good faith, 'buyer beware,'" says David R. Bonneville, a structural engineer with H. J. Degenkolb Associates, a San Francisco earthquake-engineering firm. "But there's so much potential for litigation now, people want to know a lot more about their buildings than they used to."

Disaster, however, has been the prime driving force. The past ten years have produced a string of failures of unprecedented scale, some tragic, some spectacular, all the more so because several occurred in new structures presumably built with all the benefits of space-age technology. Among engineers, their names bear a chilling majesty, like the names of the big battles of World War II. Skyline Plaza, Fairfax County, Virginia: 14 workers died when a huge portion of the 23-story complex collapsed during construction in March 1973. Hartford Civic Center Coliseum, Hartford, Connecticut: the roof fell in under heavy snow and ice. Willow Island, West Virginia: a cooling tower under construction collapsed, killing 51 workers. Hood Canal, Washington: the 1.2-mile-long, $24.6 million Hood Canal Floating Bridge disappeared in February 1979.

In Kansas City, a tragic tea dance

In engineering circles, the name Kansas City has an especially somber ring. First, in June 1979, the roof of the city's five-year-old Kemper Arena collapsed; had the stadium been occupied this could have been the nation's worst structural disaster. Two years later, fate, design change and lax inspection made up for that previous bit of grace. On the night of July 17, 1981, two suspended walkways at the Hyatt Regency hotel collapsed during a tea dance, killing 114 people and injuring nearly 200 others. There are other names: Harbour Cay, Mianus River, the Chickasawbogue Creek Bridge. In April 1987, two more disasters occurred: on the 5th, the Schoharie Creek Bridge on the New York Thruway collapsed and killed ten people. A little more than two weeks later, 28 construction workers died when two towers at L'Ambiance Plaza Building in Bridgeport, Connecticut, crumpled during construction—this last an example of so-called pro-

Muenow's rebound hammer creates shocks that are analyzed to reveal cracks, voids, other problems.

gressive failure, an engineer's greatest nightmare, where the failure of one component eventually destroys an entire structure.

In 1987, a Federal Highway Administration survey found that nearly 250,000, or about 42 percent, of the nation's highway bridges were "deficient," with faults that limited their load, serviceability or safety; the agency estimated that repairs or replacement of all the bridges would cost $51.4 billion.

Autopsies, as crucial to structural engineering as they are to medicine, show that most catastrophic failures have more than one cause, usually errors compounded by other errors: a designer's mistake, made worse by a worker's mistake, made worse still by lax inspection. These may trigger a collapse all by themselves, or may leave the structures vulnerable to one final shove, perhaps a gust of wind or a mild earthquake. At the Kansas City Hyatt, the original design of the walkway system was made lethal by a modification during construction. The walkways were barely able to support their own weight. In designing and building large structures, engineers have to deal with overwhelming complexity. There are dozens of specialists—electricians, glaziers, welders, curtain-wall experts—each responsible for a piece of the structure. There are millions of connections that need to be bolted, welded, sealed. Each building, moreover, is a custom job. One of a kind. "Unfortunately," said an engineer, "the demands of our profession are such that no one person can check all the work." He made this remark in his statement to a Missouri review board, which shortly afterward revoked his license. He had helped design the Hyatt skywalks.

The more innovative the structure, the more likely errors are to occur. The architect, seeking to push the limits of technology, may push too far, says Peter Blake, a practicing architect and professor of architecture at Catholic University in Washington, D.C. Workers unfamiliar with the materials or techniques required by the building's designers may simply decide they're the experts and fall back on methods they consider tried and true, Blake explains. "On most construction jobs I've been on there's some foreman who says, 'All these architects, they don't know what they're doing. We've done it for years, we'll do it our way.' " The overall quality of the labor pool is also an important factor in whether a design can succeed. "The intricacy of a building that might be designed by I. M. Pei might be built flawlessly by the Japanese," Blake says. "But doing the same thing in Afghanistan would be a disaster."

Here too, however, architects share some of the blame. Blake contends that many architects don't understand how buildings really get built. "Things that look reasonable on paper don't necessarily turn out that way when put together by a full, hands-on crew," he says. Schools can't teach this kind of knowledge. "You have to be at a job site for several weeks before you can really understand all that can go wrong."

"Do you have to reinvent the wheel each time?"

The roof of the Kemper Arena collapsed because high-strength steel bolts holding the roof to its exterior frame broke. These bolts, known as A490s, could each hold 80,000 pounds, plenty of strength for the roof. But the A490 has a curious property: tighten it and then loosen it, even a few times, and it becomes so weak you have to throw it out. This property, however, was not well known among engineers, says James Stratta, an Atherton, California, engineer who investigated the collapse—and many of the decade's other great failures. And this property was one of the key factors in the disaster; these bolts were supposed to be used only in connections that stayed rigid. The connections in the arena roof were flexible. For five years winds had rocked that roof, effectively tightening and loosening the bolts, radically reducing their strength. Clearly, I suggest to Stratta, all this was obvious; this quirk of A490s should have been recognized. He isn't so quick to judge. "My God," he says, "how much research do you have to do when you design a building? How far do you go? Do you have to reinvent the wheel each time?"

Erik Larson wrote in June 1987 on the "bug cops" who guard U.S. borders against contraband plants.

Tacoma Narrows Bridge, Washington State, collapses into Puget Sound in 1940. Winds reached 42 mph. The bridge was so flexible that its oscillations led to its nickname, Galloping Gertie. Lessons from this disaster taught engineers of Golden Gate Bridge to modify its structure to reduce twisting in winds.

More important, how can you know ahead of time whether such a failure is waiting to happen? A diagnostic engineer needs all the tools of a doctor—common sense, deductive skill and technology. David M. Hart, a Boston architect, has used portable x-ray equipment to see inside the walls of historic structures. At the House of Seven Gables in Salem, Massachusetts, his x rays turned up three overhanging beams in "imminent danger" of collapse. The beams were repaired. "When you think about it, it's a lot better than taking apart a museum with a sledgehammer," Hart says.

Soon, engineers may be able to check on the health of a building simply by dialing the resident computer and having it read remote sensors spread throughout the structure. The University of Tennessee, Knoxville, plans to embed a $269,800 system of sensors into its proposed engineering and science center, including accelerometers to measure its settling and its motion during earthquakes, and strain gauges in key beams and columns to monitor its response to changing loads of people and equipment. For now, though, you can't ask a parking garage how it feels.

"Hit it!" shouts Dick Muenow, here in the permanent dusk of this most-secret parking garage, somewhere in a city in the Southeast. He is standing beside the luminous green screen of an oscilloscope that has been modified to act as a pulse-echo scanner. Similar to sonar, it is capable of seeing 200 to 300 feet into the concrete of buildings, highways and dams.

Until now, engineers have had to use diagnostic techniques of somewhat less subtlety—bashing the concrete with a sledge, shattering it with a jackhammer, goring it with a geologist's drill. They can now use noninvasive instruments like pachometers to detect magnetism, and radar to find reinforcing bars in concrete—but these only detect metal objects and don't locate cracks, empty spaces or delaminations, where concrete has broken away from the reinforcing bar deep inside a slab.

Sound waves seem to be the solution. And this, despite the bad news he sometimes delivers, has made Dick Muenow one popular guy. He has used his device and other test equipment to examine 49 nuclear plants, 5 subway systems, 2 experimental MX missile silos and dozens of other dams, buildings, garages, bridges and highways. He is discreet about his clients and just as discreet about the specifics of his technology, which he developed during his years as a researcher with the Portland Cement Association and, later, while working with an instrument company. This secrecy has made him appear to be something of a mystery man, a diviner who looks for cracks instead of water, and who gets

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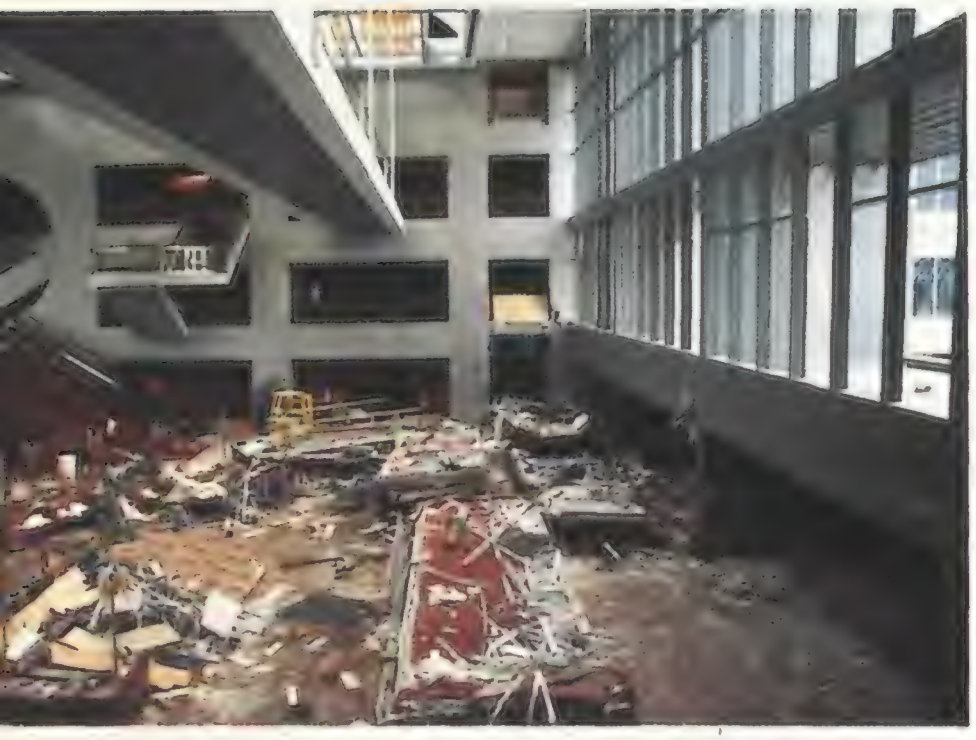

Walkways that fell in Kansas City's Hyatt Regency in 1981 were barely able to support their own weight.

Boston's John Hancock Tower has 10,348 windows; wind sucked out nearly 5,000, covered here by plywood.

paid anywhere from $2,000 to $1 million to do it.

A dozen yards away, Gary Blair, one of Muenow's associates, stands at the top of a short scaffold and pushes a Schmidt hammer against the bottom of a concrete beam. The hammer, resembling a small artillery shell, contains a spring-loaded piston that delivers a precise blow to the concrete. Instantly, a brilliant green gash appears on Muenow's oscilloscope in roughly an H-shape, with a long center shaft. A few centimeters out along this shaft there is a single, bright vertical dash.

This is not a good sign.

By firing the hammer, Blair launched sound waves through the beam in much the way a stone sends ripples through a lake. When these waves strike areas of different densities, including the opposite wall of the beam, they rebound to the surface. A transducer, which Blair holds flush with the concrete, captures the reflected waves, turns them into electrical impulses and transmits them to a computer in the oscilloscope. The computer generates an image on the screen—that broad, green H. The two side walls of the H represent the front and back faces of the beam; the shaft between them is the path taken by the sound waves. A straight and unbroken shaft indicates the beam is solid.

In this beam, however, the system has spotted a place where one segment of concrete failed to bond to another—the equivalent of a crack. "Nonbond!" Muenow calls. An agent of the contractor marks this on a copy of the garage plans.

In the concrete: bottles, sweatshirts, lunchpails

The repeated firings turn up more and more bad news. Nonbonds. Cracks. Voids. Honeycombed concrete—areas where the concrete is pocketed or grainy, much less dense than required to maintain the design strength of the beam. These problems can be caused by inadequate mixing or sawdust and other debris left in the forms before the concrete was poured. Some investigative engineers report finding soft drink bottles, sweatshirts, even lunchpails inadvertently cast into slabs and columns. Muenow will spend hours at his monitor, watching and interpreting the images. Fortunately in this case, the flaws can be fixed.

One problem that diagnostic engineers face is how to detect the subtle motions of a structure, motions that could foretell a failure or collapse, movements too slow for the human eye to record. These things worry Martin T. Mayer, who is trying to figure out just how fast the Rock is rising.

It's morning on Alcatraz Island, a desolate mound in San Francisco Bay. Mayer is on a ladder in the cool darkness under Cellblock A of the old U.S. Penitentiary here, now part of the national park system. Aiming his

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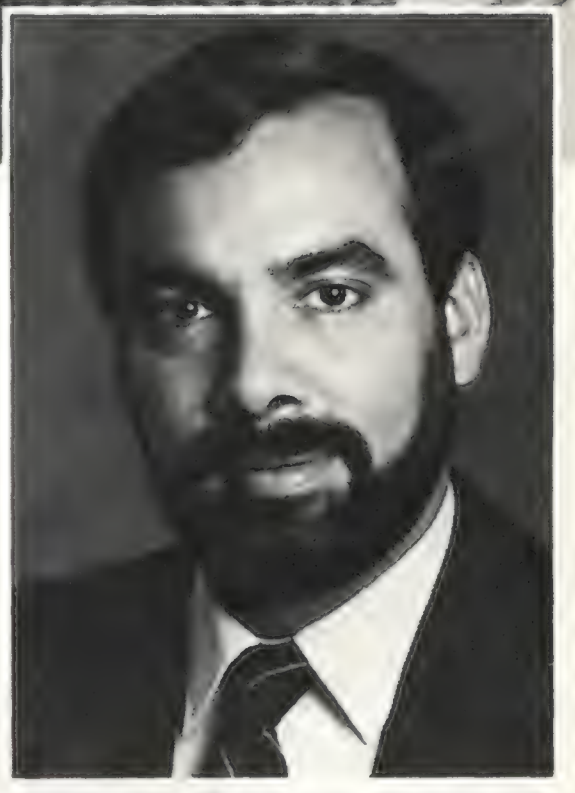

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X ray of window frame in Paul Revere House, Boston, shows nails used by 1680 builders and 1912 restorers.

flashlight at a steel beam, Mayer says, "If that thing ever goes, we're goose meat."

Alcatraz is a study in motion. Severe corrosion of its main supporting beams is propelling the prison slowly but steadily upward, and once a month Mayer, an archaeologist with the National Park Service, comes out to check the gauges that chart its progress. This basement was originally the basement of Alcatraz, a brick and iron citadel built here between 1857 and 1859 but later demolished and cannibalized for the prison construction. Huge 24-inch steel I beams support the cellblocks above, the tiny concrete cubbyholes that Al Capone, George (Machine Gun) Kelly and Alvin (Creepy) Karpis once called home.

Although Alcatraz was considered the toughest prison in the U.S. penal system, its design, construction and location practically guaranteed that one day it would self-destruct. Most nights it's bathed in corrosive salt fog and scoured by brisk, salt-laden winds. The builders, moreover, entombed a few million "Trojan" bricks in its walls. They took brick from the old fort, broke it up and added it to the concrete, unaware the brick would act as a vector, drawing moisture inward. Worse, salt water was used to flush the prison's toilets. Toilets overflowed, of course, and the plumbing leaked. The brine seeped downward and attacked crucial beams. The beam opposite Mayer's ladder shows the sheer power of this corrosion. It has expanded in all directions, pushing the concrete casing on its exposed sides outward more than two inches.

The cellblocks are clearly rising. So why does Mayer say he's not all that concerned? "It's when all this stuff dries out and starts to shrink that we worry about collapse of the structure, because we've then lost the force that's holding it together," he explains. "Thus far it's merely making the drum a little tighter. It's when the drum starts to go slack that things begin to fall apart."

"It's going to hell in a handbasket"

Upstairs and outside the prison, Mayer checks on a series of other gauges that are set across cracks. The last of these tells a more worrisome story. It straddles a crack at the top of a retaining wall behind the remains of the warden's house (p. 126). As a precaution, the area below has already been closed to visitors. In just one month, Mayer discovers, the crack has widened another half-millimeter. As we stand there atop the wall, he is less than reassuring. "It means that the wall's falling down," he says. "This is the active one; it's going to hell in a handbasket."

Alcatraz underscores a fundamental dilemma facing designers: How do you design a structure that will last a hundred years? Clearly you can't test it for a hundred years first to see if it can survive a century of wind, ice, snow, sun, smog, vibration, earthquakes and acid rain. This year's bright idea could be the next decade's disaster. The opposite can also be true.

The owners of the Golden Gate Bridge (SMITHSONIAN, July 1982) learned a few lessons from a big storm and a bridge nicknamed Galloping Gertie. The Golden Gate is limber. Its center span can rise or fall as much as 10½ feet. On May 24, 1987, pedestrians crowding the bridge for its 50th anniversary constituted the greatest load in its history, flattening the arch 6 feet at the center; the bridge wasn't strained in the least. In high winds, it can bow out 27 feet at the center. But its designers knew little about the complexity of wind. They knew, of course, that wind could exert devastating force on bridges: that's why the Golden Gate was made so limber. But only three years after it opened, its engineers found their own assumptions challenged by the collapse of the Tacoma Narrows Bridge. Designed by Leon Moisseiff, who had also been a consultant in the design of the Golden Gate Bridge, the Tacoma Narrows Bridge was one of the sleekest and lightest suspension bridges ever built, but it moved so much that drivers called it Galloping Gertie. On November 7, 1940, in winds of only 42 to 44 miles an hour, four-month-old Gertie went crazy. She twisted and dipped. Rippling sine waves undulated along her central span. Then Gertie got down, rocking into a striptease, peeling loose hunks of roadway and bands of steel. The rest of the center span soon followed,

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dragging down only one living creature—a dog left behind in a reporter's car, too frightened to escape. The whole thing was captured on film.

Until Gertie, says Daniel E. Mohn, chief engineer of the Golden Gate Bridge, Highway and Transportation District since 1981, engineers hadn't realized that wind can do more than just exert broadside force. "It also develops lift," he says. "The deck of a bridge is an airfoil like an airplane wing. In the early '30s they didn't know how to evaluate that. They didn't *think* to evaluate that."

The district installed wind-measuring equipment and began to monitor the Golden Gate's movement more closely. In cities around the country, other engineers did likewise with their own bridges. On December 1, 1951, a storm with wind gusts of 70 mph blew into the Bay Area from the southwest. "That storm was classified as a hundred-year storm, the kind that you'd expect to happen no more than once or twice in a hundred years," Mohn says. The storm sent a sine wave back and forth across the main span. "That in itself is generally not damaging to a bridge like the Golden Gate. But in 1951, the sine waves got out of phase from one side to the other and started the bridge twisting, torsionally, to the point where at the peak of the storm one side would go down about ten feet and then reverse, so you'd have a twist." Although the storm did extensive, but superficial, damage, it subsided before anything worse happened.

Frightened, in 1953 the district installed 5,000 tons of steel to stiffen the superstructure and prevent that kind of bridge-killing torsion. On December 22, 1982, another storm struck—the same month as the 1951 storm, same winds, same power, same direction. The bridge was closed again, this time because a moving van had blown over on the roadway.

"The wind was blowing like hell," Mohn says. "You couldn't stand up." But he drove out on the bridge anyway and, hanging on to his car, examined the main expansion joints that give the bridge its flexibility. "I was fascinated. The joints were opening completely—three feet—and then closing completely. You never see them move that fast—you could stand there for a *year* and not see that much movement. But here, every 15 seconds they would completely open and close."

The bridge wasn't damaged, but those earlier les-

In basement of Alcatraz cell house, Martin Mayer touches bowed-out concrete that covers rusting I beam.

He bends over retaining wall at corner of warden's garden to read gauge that measures six-inch-wide crack.

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The Golden Gate Bridge rises, dips, sways with varying loads and wind, has shifted 6 feet in 80 mph winds.

sons may have saved it. Frank Stahl, chief engineer of Ammann & Whitney Consulting Engineers in New York, was a consultant to the district, and flew out after the storm to make an inspection. "That storm was worse than the one in 1951," he says. "We're convinced that if they hadn't put in that stiffening in '53 we would have lost the bridge."

In December 1983, with almost supernatural persistence, the same hundred-year storm occurred yet again, in the same pattern, right down to the overturned moving van—and again the bridge was unscathed.

But even moderate winds can do damage to a building that is poorly designed. They can suck the glass off skyscrapers, jam elevators, crack walls, knock over pedestrians and raise high seas in the toilets of top-floor lavatories. The taller the building, the more likely it is to have wind problems and the more likely its owners are to consult Jack Cermak and Jon Peterka, both wind engineers at Colorado State University. In 1963, Cermak made the first truly realistic analysis of a skyscraper when he tested models of the World Trade Center before its construction (although basic studies had been done on the design of the Empire State Building, which was completed in 1931).

Walking into Cermak's laboratory, I feel like Godzilla stumbling through a city built of the greatest, and in some cases most troubled, structures of all time. Tall scale models stand on tables at either side of the door. Here's Detroit's Renaissance Center, the Sears Tower, the World Trade Center and even Candlestick Park (where, during the 1961 All Star Game, a National League pitcher was blown from the mound; the umpire cried "Balk!"). Here is the Midwestern insurance tower that's been losing its marble skin after only 20 years. Here's another arena that lost its roof. And here, too, is a last vestige of an idea whose time, fortunately, never came—a floating nuclear power plant.

Testing for snow pressure with glass beads

Demand for Cermak's and Peterka's services began to take off in the 1970s, fueled in part by the costly and embarrassing troubles of the John Hancock Building in Boston, whose windows broke and fell, and whose frame eventually had to be stiffened against the wind. In those ten years they made 250 studies of major buildings. In 1984 alone, their peak year, they completed 49 studies. They've even done wind-tunnel tests with "snow," blowing 100-micron glass beads to gauge the pressures of drifting snow on such structures as Crater Lake Lodge and the Silverdome in Pontiac, Michigan. There is so much demand for wind analysis that Cermak and Peterka set up their own wind-tunnel facility a mile or so away.

Here in the tunnel sits a hunk of the city of Taipei. At the center is the proposed Far Eastern Plaza, two curved towers atop a low-rise structure, each tower soaring to the giddy height of 22 inches. In full scale, that's 550 feet. Squares of plastic simulate buildings that already exist around the planned site, and all this is mounted on a motorized turntable. By turning the city, you change wind direction.

There are about 800 tiny holes in each tower, and each opens into a small tube. Pressure transducers connected to the tubes convert wind pressure to voltage, which in turn is transmitted to a computer. By blowing smoke past the model, Cermak and Peterka also make visible the way in which wind currents will play on the building and on the streets below.

Peterka invites me into the tunnel, where a scale 40 mph wind is currently tearing through Taipei. A technician, standing upwind and across town, waves a long wand that releases a stream of white, titanium dioxide smoke. As he moves the wand, the smoke takes on

different patterns. It rushes past the tower's smooth curved face, then breaks up and doubles back against the rear of the building. (Wind rushing across surfaces sets up powerful pressures that, in the real building, would tend to pull the glass outward.) Farther down, a small vortex—a miniature tornado—rises from the base of a tower, and smoke zips across the roof of the low-rise. "That's an incredibly high wind speed!" calls Peterka. He has to shout above the whooshing of the tunnel's huge fan. "The architects were thinking about using that as a pedestrian area. We're going to advise them they probably won't be able to do that."

Studies like this can't spot every problem. Engineers at the World Trade Center are still wrestling with a curious effect that bedevils its 16 long-haul elevators, each of which travels a full 78 stories. As the towers sway, so do the elevator cables. But when an elevator rises, it effectively reduces the length of the cables, thereby increasing the frequency at which the cables vibrate. "Did you ever jump rope and then have one partner pull back a bit?" asks Robert Linn, deputy director of physical facilities at the Trade Center. "All of a sudden the rope starts to tighten up and quiver." That's what happens in the shaft, and the force can send cables banging against the shaft walls; sometimes they even jump the shivs, the giant sprockets at the base of the shaft. This frightens the passengers, and it can knock an elevator out of service for days. Now, the Trade Center is using devices that dissipate some of the energy in the cables. The main line of defense, however, is to run these elevators at half speed whenever the wind tops 45 or 50 mph. "We were wise," says Linn, referring to that early battery of wind-tunnel tests. "But not completely wise."

Some structural flaws can be beneficial—depending on your point of view. In the early 1900s, men loved Manhattan's Flatiron Building; women probably considered it a failure. The wind would rush down its face and strike the sidewalks of 23d Street, then blow back upward, lifting skirts and petticoats. A new expression was heard: cops who came to roust the girl-watchers would shout, "Twenty-three skiddoo!"

Jack Cermak inspects his ten-foot-wide model of Chicago, with Amoco and Sears towers in clear plastic. Model, rotated in a wind tunnel as smoke is blown through, shows wind patterns around skyscrapers.

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Note: Photographed with Hasselblad, 80mm lens, f/16 shutter speed.1/60 strobe 1/2000.

By Jake Page

There's never a dull moment where teens learn a trade

Ohio's Great Oaks vocational system has come up with an astute mixture of academics, training and personal support—and it works

Seniors Eric Leasure (doing the balancing act) and Todd Danbury man the kitchen during after-school job.

Listen for a minute to Angie Smith.

She spoke with me just before graduating last year from the Scarlet Oaks School in Sharonville, Ohio, north of Cincinnati. As she talked she made graceful arcs around herself with her hands. At the time, she was holding down two consecutive jobs after school—both in clothing stores—and she was explaining how she got one of them.

"I went in and gave them my résumé and, of course, I had dressed right, like I wasn't wearing anything wild. . . . I was tidy, and I had an interview. And what I was really saying to the lady during the interview was: 'Look, I'm not just your average high school student. I'm a vocational cooperative student and that means I'm superior.' " This is a revolutionary attitude.

Among other things, one doesn't normally connect Ohio with revolutions. The big American one was largely an East Coast affair, that being where the Colonies were. And today it is a given that new ideas blow eastward on the prevailing California winds. But in a particular school system in the Cincinnati area—a district serving 37 high schools—20 percent of all juniors and seniors, 3,000 in all, are engaged in an educational program that is revolutionary by virtue of its concentration on some old, simple ideas—and a few new ones.

This is the Great Oaks Joint Vocational School District, which includes Angie's campus, Scarlet Oaks, along with three others—Diamond Oaks, Laurel Oaks and Live Oaks—and here they practice vocational education with a vengeance.

Jail. The awful dark, sooty place of old brick with greasy antiquated machines and dank halls. That has long been the image of the trade school. "If you don't shape up," the mythological schoolmaster's voice intones, "you're going to go to. . . ." Right. The vocational school. The place for dead-enders.

There has been an opposite way of thinking about vocational education, of course. During the Lincoln Administration, the United States Government made a powerful commitment to the idea, establishing the land-grant colleges—the A & Ms (for agricultural and mechanical). It was evident then that for the country to succeed, it would need a lot of people with a working understanding of new technologies. And there has long been a federal role as well as a state and local one in providing technical education for those who seemed

At Laurel Oaks campus, firefighting instructor John O'Rourke teaches rappelling—and trust—to a novice.

Cosmetology student Amy Duncan is guinea pig as Angel Gilpin gets hands-on training at head massage.

destined to go into trades rather than completing an academic high school or college career. Nevertheless, vocational education has generally taken a backseat in education budgets and in the dreams of parents for upwardly mobile offspring.

"In some parts of the academy," said William Bennett, U.S. Secretary of Education, to the members of the American Vocational Association in 1985, "there is sometimes condescension, sometimes a patronizing attitude, toward those who know how to do things." But not at Great Oaks. Here's Angie again, a year and a half into studying business management and marketing: "I decided to buy a new car. So I went down to the lot and told the salesman, 'Look, I've learned all the tricks and gimmicks you're going to use on me. I learned them at my school, so don't bother. I want that car over there and this is what I'm going to pay you for it every month. No more and no less.' "

After frantic discussions between the salesman and the manager in the back room, she drove off in her new car to the bank, walked in and talked her way into a $600 down payment for the car. No tricks, no con. Just knowing how to do things, and confidence.

Self-confidence and self-esteem seem everywhere as one wanders the halls of Scarlet Oaks School, a light-filled building of 310,000 square feet. It is an open place with many appealing aromas. One walks past the area set aside for chefs and bakers—an enormous kitchen, bigger itself than most cafeterias—and there is the smell of bread baking. Beyond is perfume: the beauticians' shop, set up complete with a waiting room. Elsewhere, there is the smell of newly cut lum-

Photographs by Lynn Johnson/Black Star

Fledgling firefighters are critiqued after a simulated search and rescue, done blindfolded, of fire victim.

Learning self-defense for law enforcement, William Chambers delivers blow to long-suffering Numb John.

ber from the cabinetmakers' area and a pungent whiff of ozone in the electricians' shop.

A group of students emerge from a door and move cheerfully down the hallway. Its walls are painted in primary-color supergraphics. They are clean as a whistle; no graffiti, no peeling paint. A visitor wonders if he is seeing the results of some kind of subtle mind-control techniques.

In the automotive laboratory, a handful of young men are up to their elbows dismantling a diesel engine. They look up. One of them, who seems to be in charge, says "Good morning" and they all return to work. "That's the foreman for the day," explains Tom Wyatt, the Scarlet Oaks principal. "They take turns. It's important that they know from the start what it's like. They won't be foremen right away once they're out in the real world, but they'll do better work if they know what a foreman's problems are firsthand."

Wyatt goes on to explain that the school receives many visitors, often people from local business and industry. "There are two things about that," he says. "When these kids are out of school, there are going to be plenty of distractions wherever they are working. We want them to get used to people coming and going. That's why all these learning areas and labs are wide open. And also, we keep telling them that any stranger walking around here might be a future employer. You don't want to be goofing off if the guy standing there might see you next across an employment desk."

The visitor hired a student on the spot

On one occasion, Wyatt says, a General Motors dealer walked through and stopped to watch an auto-repair class for a while. Then he picked out one student, a senior, hired him on the spot, and spent $10,000 of his company's money to send him off for advanced training in computer diagnostics. That, one realizes, is the subtle mind control at work.

Outside the cafeteria, on an easel, is a large, red sign announcing the "Employer of the Month." It is the Bonnie Lynn Bakery, and a few people have been asked to sit down for lunch to honor Bob Larson, the small chain's founder and president.

Preluncheon introductions are made by a dashing-looking man with a handlebar mustache and cowboy boots. This is Dr. Harold Carr, the superintendent of the entire Great Oaks district. He introduces two student bakers to Bob Larson and guilelessly describes to all the strategy of the occasion: "We like to honor our employers with these little lunches, to let them know how much we appreciate their help. It also helps keep them interested in us, and keeps their minds focused on our efforts here."

The meal, catered by student chefs and served by a

senior in food services, is a modest affair. Larson converses quietly with the two baking students and the only hitch is when the serving cart erupts with several trays of crockery, and dishes hit the floor with an endless clatter. Larson looks over at the superintendent and says, "Don't worry, Harold. That only happens when there's a guest like me."

There is a friendly collusion here, quite obviously, between industry and school. And it is a collusion that Harold Carr has fostered since his arrival in 1970, two years after the Ohio Legislature mandated that all high school students have available to them comprehensive vocational education. Carr was himself a product of vocational education—auto repair and machine trades—but he went on to college to study vocational ed. In 1975 he became superintendent.

"In those days," he says, "vocational education was the plague around here. We needed the cooperation of industry, but we simply had to prove ourselves before we could ask them for any help." With an annual levy called millage (a tiny—one could say acorn-size—tax on the assessed property value of homeowners in the district), what would later become the Great Oaks district was created in 1970 to serve as the vocational department for 20 school districts in Hamilton County and 15 in nearby counties. On land from the U.S. Health, Education and Welfare Department, as well as from an idle Air Force base and other sources, four campuses were built and operating by 1973. Today, they serve an area spreading across 2,200 square miles of southwestern Ohio. An educational octopus, its tentacles reach into the lives of students at 37 "home" high schools in 12 counties. Students are bused to one of the four campuses each day for their vocational and academic curriculum, returning to their home schools for extracurricular activities.

Local businesses began to notice

Over the past decade the new vocational system has gradually proved itself, as students won national competitions in areas like cosmetology. A digital computer was installed at one campus; today, virtually no Great Oaks student escapes without being computer literate. (No one graduates without knowing CPR and Red Cross techniques, either.) Businesses in the area began to take notice, not only of the high school program but of the rapidly growing adult education efforts.

In the afternoon around 3 o'clock, when the high school students have gone home, there is about an hour of quiet in the laboratories and work spaces of the campuses. Then they fill up with adult classes, men and women learning new trades, new careers. Assistant superintendent Rosemary Kolde explains that the key to success has been flexibility. "When we

Dental-assistant students Janet McFarland (holding drill), Dionna Mabry talk hygiene with preschoolers.

Meat-processing students slaughter a calf raised by farm-management students, who watch from above.

It's not easy being a teenager; Sandy Louk tries to pull herself together after a go-round with a teacher.

After Sandy quit the meat-processing program, Tim Hunter visited her home, persuaded her to come back.

found that people who wanted to retrain in one field or another would get off work at 2 A.M., we located instructors who would teach at those hours," she says. "We have to adapt our service to the needs of the community, whatever they are at any time of day."

Today, some 60,000 adults enroll annually in courses ranging from practical nursing to motorcycle safety to beekeeping to microcomputer accounting. There is a police academy run by retired Cincinnati cop Jim Combs. Local law enforcement agencies send recruits and veterans to Combs for training.

The Great Oaks system backs up its huge training investment by helping people find jobs. Next door to the Scarlet Oaks school is the Center for Employment Resources. For $85 (it costs about $300 privately) one can take a battery of tests and find out what kinds of jobs one may be suited for and where to look for them. The center, presided over by James E. Frasier, works both ends of the street. Its counselors hustle contracts with industry, often looking into a new job category and developing tests to find out what sort of person would function best in it. Then they find the people and, as needed, train them.

There's also an intelligent plan at Great Oaks to provide training for the vocational teachers themselves. Many of them were recruited from industry, and periodically they are sent back out on an "industry exchange," a week or so of work in their field to keep them in touch with the real world.

"For my last industry exchange I chose the hair salon at Saks Fifth Avenue in Cincinnati," says Mary Williams (p. 138), who has been teaching cosmetology at Scarlet Oaks since 1973. "It's a high-tech, high-fashion place; everything is really up-to-date." Williams worked there for a week, at the end of which the manager surprised her by announcing, "We'd like to keep you." She was flattered but, with the soul of a true teacher, had other ideas about who might end up where.

"At that time I had a student who I knew would fit in there; she had all the assets," Williams says. After reporting to the whole class about the salon and what was happening in the market, she asked the girl privately if she'd be interested in working there. "She was awed," says Williams. "Her response was, 'Omigosh, that's a big step! You think I'm that good, huh?' And I said, 'Yes, you're that good.' She's been working there two or three years now, and it's going really great. Now *she* comes back to talk to my classes about her work there."

Jake Page is a free-lance writer who lives in Virginia. In April, he reported on research efforts to preserve Brazil's tropical rain forests.

Taking a break between school and his job, young chef Eric Leasure kicks back in a corner of his bedroom.

Great Oaks' "real world" attitude is found in the Scarlet Oaks approach to academics as well. In 1978, Carr and his associates persuaded the high schools to approve a major change in the school's program. Basically, the idea is to tailor the academic courses to the needs and interests of the students. Teachers are recruited who can teach math, science and English in synchrony with what the students are learning in their vocational programs.

The fundamentals of physics, for example, are taught when they apply to the work at hand. Most high school physics students learn about coefficients of heat expansion in a canned lab situation with a beaker of water. "Someone who is a welder confronting a steel pipe that is about to be heated to 1,000 degrees thinks about these formulas a lot differently," says Carr. "And he remembers it. There is absolutely nothing any student can't learn once he realizes he needs to know it."

David Nellis teaches science this way at Scarlet Oaks. Today, he's giving a class of chefs-to-be a bit of basic biology—cell organization and such, sometimes aided by computerized course work. Then he relates this information to the biology of nutrition, bringing in examples from fast-food chains like Wendy's, where there is a move toward whole-grain breads and certain kinds of health food. Next comes kitchen maintenance: the kids learn to Graham-stain cultures and are sent around the kitchen—which they are responsible for cleaning—collecting samples from the stoves, counters, refrigerators. "It's a very powerful lesson to see a culture grow under your eyes, when it was taken from a place you thought you had cleaned," he comments.

Nellis says that a lot of the kids he teaches were shortchanged in the home high schools, left behind academically and often socially. Here, chiefly because they are in the hands of their vocational teacher for two and a half hours a day, they simply don't get left on the side. It's not, he says, because of smaller class size—there are 20 juniors in food services, all working at the same time with a single instructor. The key seems to be the master-apprentice relationship that builds up, with the teacher helping at a more personal level when necessary.

"You never know with these kids what their needs are going to be on a given day," says Mary Williams. "They can't concentrate if they're into fighting with their moms and their boyfriends." On some days she goes in keyed up to do a fantastic job of teaching, and then someone comes in with a problem that has to be dealt with. "I have a good feel for my students," says Williams; "I know when something is going on with them." So she'll ask them if they'd like to talk, and they

With calm authority, cosmetology teacher Mary Williams reviews attendance with Laura Reckers.

usually say yes. Her advice is thoughtful. For instance, to a student who has lost interest in a course and wants to drop it, she'll say, "Somewhere down the road you'll use this. It's OK to be successful at something you don't want; it's kind of a discipline. Get yourself into a pattern of success."

"We know from the employers that they want kids with skills, sure, but mainly they're interested in good work attitudes," says Pete Kaufman, the commercial baking instructor. "We spend a lot of time in every program on safety and good work habits. We have incentives. If a senior keeps a B or A average and his attendance is 95 percent, he can go on early placement, get a job and still graduate. I keep hearing the work ethic is dead . . . . it doesn't need to be."

But the emphasis on work attitudes doesn't mean there's a shortage of fun. Student chef Eric Leasure (p. 132) will tell you, for example, that the hardest thing he's had to learn was ice carving—"where to cut with the chain saw, how much to take off with the ice pick." Last December he and a friend were assigned to do one in the shape of an animal. "We did what was supposed to be a donkey and it got messed up," he says; "it turned out to be a dog. But we used it at the Christmas banquet that we throw every year, and people thought it was neat."

Of course, it is not all rosy at Great Oaks. Kids can and do flunk. Rarely is someone expelled—the two grounds for expulsion are dealing in drugs and physical contact with a staff member. Like any group of teenagers, many are troubled to one degree or another. "It's hard to be a teenager today," says Kenneth Kay, the student advocate coordinator at the Scarlet Oaks campus. "There's 20 times the information there used to be, but the same lack of wisdom. A 15-year-old is still 15. It's not surprising so many kids are depressed." Kay used to work nearby in the juvenile court system where, he says, "I'd see kids who were already in deep. I wanted to work where I had a chance to keep them out of that situation, so I came here."

More income and higher employment levels

How well does vocational education work? Five years ago, a state-commissioned study by Ohio University, the first to use data from the Internal Revenue Service, found that graduates of Ohio vocational education programs earn 21 percent more money four years after graduation than high school graduates without such training. Further, unemployment is lower—especially in electronics, auto mechanics and health occupations—for vocational graduates than for those in the general work force who are the same age and have the same number of years of schooling.

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Data-processing instructor Patrick Miller, at center, follows the reasoning of Kimberly McKenzie (left) and Shelonda Stewart as they try to create a graphic on the PC; think the problem through, he reminds them.

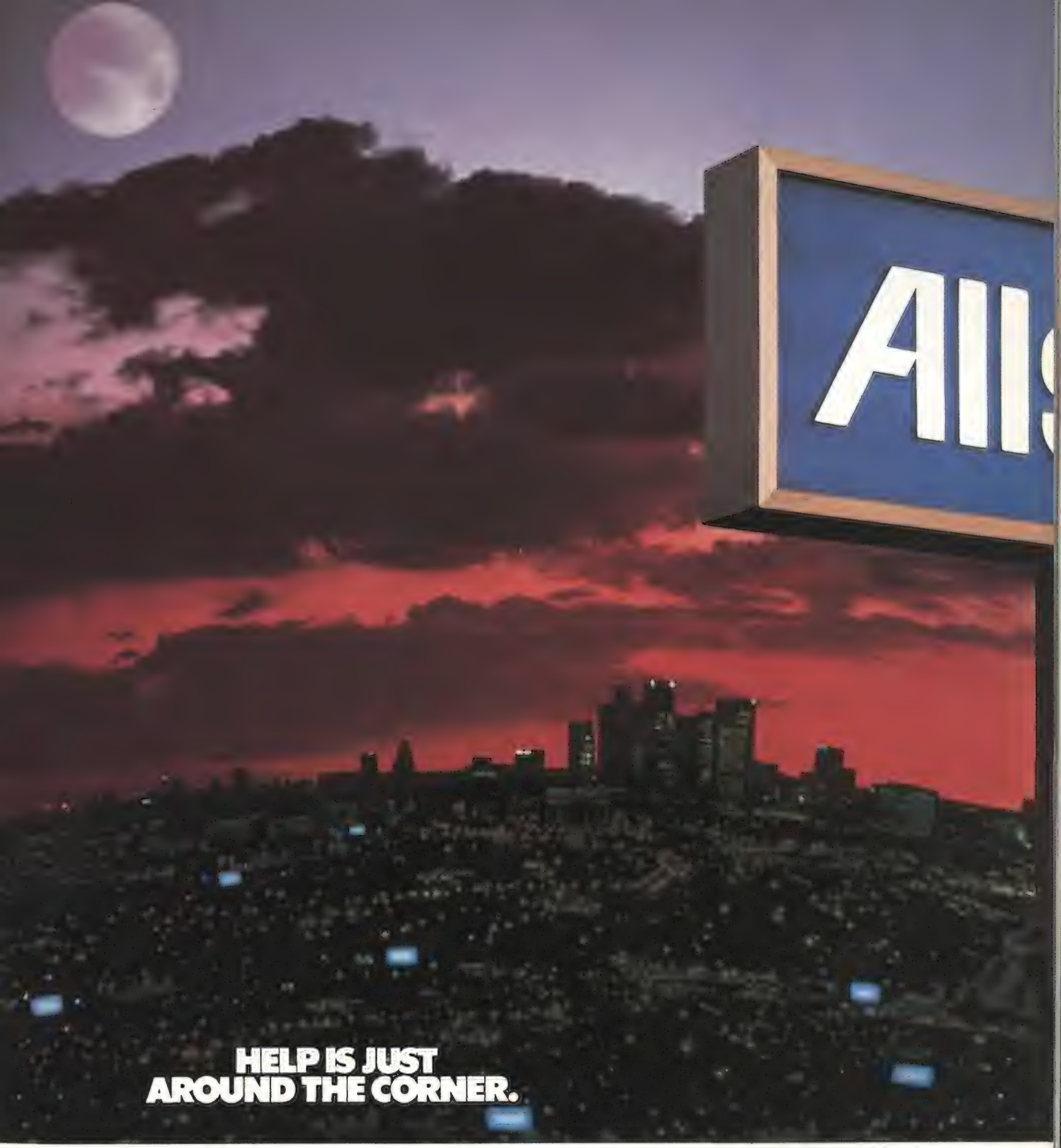
every time an individual student gets a strong start in his or her chosen career. One such is a recent graduate of Royal Oaks named Joe Vilvens. "My father was a trucker," he says. "I grew up with trucks, with diesels. Diesels aren't that complicated, but they're big. All the parts are enlarged." Joe, himself diesel-size, was uncomfortable at his home high school. He was something of a cutup; he once went to a Halloween party dressed as the Grim Reaper—and the teachers were unhappy.

Joe got his first job about a year ago after a phone call from a 1974 graduate of the diesel program at Great Oaks. This was Jay Goyert, a 28-year-old mechanic-entrepreneur who is now certified in three states to weld, plumb, electrify and otherwise maintain and rebuild such heavy equipment as the monstrous machines that retail in six figures and are used for road building. Goyert is a member of the Great Oaks Advisory Council, a large group of people who work in industries that range from standard-bred horse breeding and training to the Ford Motor Company. These advisers are asked to make sure that the school is teaching what the job markets—that is, they themselves—need. And, often as not, the advisers hire Great Oaks graduates. Goyert needed some help, so he called his alma mater.

"You know me," Goyert had said on the phone, and of course they did. "You know what I want in a mechanic." Scarlet Oaks selected Joe and sent him over for an early-placement interview. He was hired on the spot.

The arrangement was that Joe would attend his vocational and academic classes in the morning and report for work in the afternoon. His first day on the job, Joe recalls ruefully, he mismaneuvered a truck and "bent" a fence.

His second day was better. I followed him around that day to get a feel for the life of a vocational-ed student, and I was bushed by the time I bade him goodbye that evening. The day began at a few minutes before 8 A.M. in the diesel "lab," actually a section of the hangarlike garage at Scarlet Oaks. He spent a while helping to rebuild a ruined Cummins engine that was loaned to the school by an old trucker who didn't care when it was fixed but wanted it to be in working order eventually. The engine looked more



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Both: Gordon Baer

Harold Carr, superintendent of the Great Oaks system, stops in at the medical assisting lab for a checkup.

Hunched inside the open jaws of a road-tractor cab, mechanics-to-be in the diesel lab work over an engine.

like a piece of petrified wood than like a precision machine. Three student teams had been working on it for several months, taking it apart and reassembling it, learning the techniques of replacing ring seals with a tolerance of five-thousandths of an inch. "By now," Joe told me, speaking of the work in the lab, "a lot of this is kind of boring."

Later that morning in a classroom upstairs, Joe was at the end of his English class. He had put the finishing touches on a research paper (most students tend to write about their vocational specialty, but Joe chose to write about musicians, being a drummer in his off time) and was doodling on a crossword puzzle in a workbook called "Building Word Skills." In a soft voice he chatted with me for a few moments about deregulation and less personal income for truckers and less money for maintenance, which is why, he says, some trucks aren't as safe as they should be.

His classes finished, Joe headed out to run several errands for his new employer. At 1 o'clock he pulled his 1978 Chevy truck into a large fenced yard behind a row of residential buildings. In the dusty yard there was a barnlike garage and an array of machines lazing about like an oversize Pleistocene football team waiting for the training staff. Joe surveyed the patients. Among them was a 941 Caterpillar dozer, disabled; and a Richman diesel auger machine that couldn't, for the time being, dig 250-foot-long holes horizontally through the ground because of electrical problems. It costs $85,000 to buy one of these augers and a lot more than that to obtain another rare species lolling in the yard, a cement-curb sculpturing device. There was an assortment of dump trucks and pickups that needed attention, including one that had had an electrical fire in the cab. Joe went into the garage. His employer had told him that the garage and the yard were now his office—he was to put in 40 hours a week there after school.

"They need this one first," said Joe, hopping up onto the front bumper of a GMC dump truck, opening the dusty hood with a clank and peering in at the rusty engine. Then he disappeared into the shadow under the hood, and sat on top of the engine. When I asked him about the problem, he said he didn't know yet. "But I wonder," he added, "why this wire isn't connected to anything."

Astride the diesel engine in the GMC, Joe was at home. He stayed in the yard till dusk, getting paid, getting school credit and getting things back on the road, a young man doing what he'd always wanted.

It's lunchtime at Scarlet Oaks and in a scene familiar at any high school, kids make a beeline for the cafeteria.

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The World Next Door

Yellow-headed parrot from Mexican islands appeared with morning glories, whose seeds it liked to eat.

By Joseph Kastner

When everything became 'too tame in his native land'

A show, a book, a portfolio salute the work of Andrew Jackson Grayson, who left his businesses to find and paint exotic birds

A highly romantic portrait by William Jewett shows Grayson in buckskins, with wife, Frances, and son, Ned.

Back about 1830, when he was in his early teens and roaming the bayous around his father's Louisiana plantation, Andrew Jackson Grayson came to know birds well and to develop what he later called a "rising talent" for drawing them. But the talent was knocked out of him, quite literally, by a schoolmaster who, catching him at drawing instead of at his lessons, walloped him on the head. Young Grayson thereupon broke his slate over the teacher's head and was forbid-

Called *The Promised Land*, it re-created moment in 1846 when the family first saw the Sacramento Valley.

den by a stern father ever to draw birds again. He obeyed for a quarter of a century. But in 1853, by then a well-known California merchant and land speculator, Grayson dug out an unused set of watercolors he had given his own son and began to paint birds again.

This act led him, at the age of 35, into what his friend and eulogizer, Bret Harte, called "a life . . . of vagabondage and monomania" and a better chance of "getting into history." The vagabondage, Harte indicated, had a purpose, and the mania a reasonable goal —to study and paint all the birds of the Pacific coast, and to publish them in a grand portfolio. As for history, Grayson kept brushing up against it from the time he joined a wagon train to go West in the momentous year of 1846 until, two decades later, he gained the patronage of the Emperor Maximilian and his Empress Carlota, the brief, doomed rulers of Mexico.

When he died in 1869 of yellow fever caught while

Laughing falcons, with lunch in the form of a lizard, were first sighted by Grayson near Río Mazatlán.

tracking down birds in Mexico, Grayson had finished almost 170 engaging bird paintings. He could never make enough extra cash from his various businesses to cover the enormous expense of the lavishly illustrated book necessary to publish them. They were placed in the archives of a California library, and his name disappeared from nearly everything but a few bird lists, remembered because it had been given to a dove (*Zenaidura graysoni*), a mockingbird (*Mimodes graysoni*) and some others. Grayson is at last being given his proper place among American nature artists. A handsome portfolio of his work and a biography have lately been published by Arion Press. In addition, his paintings are on exhibit through July 14 at Smithsonian's Museum of Natural History.

The Smithsonian show is a kind of homecoming for Grayson. Shortly after he started using his son's watercolors, he wrote to the Institution asking for books and advice; he offered to collect bird specimens in return. Thus, as happened to dozens of innocent bystanders in the 19th century, Andrew Jackson Grayson fell into the benign clutches of the Smithsonian's Assistant Secretary, Spencer Fullerton Baird. A selfless scientist and relentless recruiter on behalf of its growing collections, Baird set out to catch and use anyone who would advance the cause of American natural science and of the Institution, both of which he was busily shaping into their modern forms. With a study of Pacific birds, Baird urged Grayson, he might well become known as the "Audubon of the West."

Like Audubon, Grayson was an adventurer and a single-minded romantic. As a young man he ran a general store in Louisiana, then a boardinghouse in St. Louis. But, his wife, Frances, once said, "things had become too tame, too well known in his native land." In St. Louis at age 27, he placed a notice whose headline shouted "HO FOR CALIFORNIA!" and promptly

This black-capped vireo made a fine portrait. The bird summers in Kansas, migrates to Mexico in winter.

Reddish egret, painted in 1866, was one of thousands of specimens Grayson shipped to the Smithsonian.

Trio of black-vented Orioles enjoying coffee beans caught the painter's eye near Mexican town of Tepic.

announced the formation of a wagon train bound for the Pacific lands. Within two months he was headed West with Frances, on his way, he hoped, to eventual wealth and immediate adventure. The fateful year was 1846, when the future possession of California and areas in the Northwest hung in the balance between Mexico, Great Britain and the expanding United States.

The trek was slow, the way often hard. "Nothing to brake the monotony of the eternal solitude as in paneful silence we marched on our lonely way," Grayson wrote in a prose always more polished than his spelling. By fall he had left the wagon train, loading his wife and 2-year-old son on their gray horse to walk them through the mountains and confront a moment no immigrant ever forgot: the first sight of the California valley. "The Scene was grand," he wrote.

California was caught up in assorted struggles. Settling his family near Sutter's Fort, Grayson served as recruiter for John Charles Frémont until the handful of Yankee Californians won their independence from Mexico. In 1847 he moved to San Francisco, then called Yerba Buena. Thriving in this freewheeling world, he went into a succession of enterprises, sometimes several at once. He opened stores in San Francisco and Stockton, selling assorted items including beaver-cloth coats, Canton flannel drawers, fine linen shirts, frying pans, books, cigars, pickaxes and diamonds. Successively he served as clerk to San Francisco's mayor and as a representative in the district legislature, and he even joined the vigilantes raised to keep order in gold-rush-torn San Francisco. He bought and sold land, ran a shipping line up to Stockton and, in 1848, mined gold at Jamestown—"it liked to killed me," he complained, coming away not much richer. But the gold rush enriched him anyway. A San Francisco lot he bought for $16 in 1847 sold for $8,000 a few years later. He founded the town of Grayson, now a small farming community, amassed capital of $60,000 and bought his wife a piano, which had been freighted from the East Coast around Cape Horn. But the bad times of 1851 left him bankrupt.

Ornithology, self-taught in the field

Birds had always been in his mind, yet it was Frances Grayson who finally set him on his way to painting them. A wifely paragon whose graciousness softened her husband's sometimes overbearing manner, she showed him a copy of Audubon's *Birds of America* in a San Francisco library. Overwhelmed, Grayson vowed to do for birds of the Pacific Slope what Audubon, who had died two years before, had done for birds elsewhere in the country. There was no one to teach him ornithology or art, so he taught himself, shooting and skinning specimens in order to study anatomy, making

Grayson made a living as a merchant and in real estate, but he kept running away to the woods, often recording people as well as birds. This sketch is from a trip through California's Kern River country.

sketches and final notes for coloring. "I am quite an amiture in this business," he admitted. In 1856, after three years of practice, he wrote to the Smithsonian.

Spencer Fullerton Baird cheerfully promised "all the aid in my power." As Assistant Secretary (later as Secretary) in charge of building up the natural history collections, Baird was constantly guiding and goading people in the field, sending them books, equipment, advice and, very infrequently, money. (The Institution was only ten years old and money was scarce.) What Baird wanted from Grayson were bird specimens and life histories; Audubon's "true merit," he wrote, "was not in his drawings, but in his masterly delineations of . . . the life of American birds."

Two years later, not having heard again from Grayson, Baird wrote saying, "I hope that nothing has happened to prevent further communication between us." But something had happened. Grayson hated routine and, as his fond wife admitted, was content only when "out in some unendurable place chasing some inaccessible bird." Finding life once again too tame, Grayson had leased his land and moved to Mexico to prospect for business and birds. On the first trip, he shipped out on a vessel that got caught in a storm and was wrecked on a rocky coast along the Tehuantepec Peninsula. Grayson got wet but managed to find a number of new birds as he explored ruined cities and made surveys.

Apologizing to Baird for his "rambling and unsettled proclivities," he sent along what the Smithsonian lists as: "Grayson, A.J.—Two boxes of skins and eggs of birds, and a bottle of reptiles from California." Baird was grateful, but in answer to Grayson's mention of payment he claimed he had "no funds for purchasing specimens," noting that Grayson's work would have to be done purely for the "benefit of science."

Three years later, in 1862, the Assistant Secretary had to write again: "I hope you have not been so much occupied with business as to have overlooked your first love—birds." Grayson had, in fact, been very much occupied with business. He had moved again, this time to Mazatlán on Mexico's west coast. In California, devoting himself to bird painting, he had lived by selling off his real estate. When these properties began to run out, Mexico seemed to offer a way of restoring his fortunes. In Mazatlán, he set up a store and a sewing machine agency, worked old mines for silver and gold, and seemed to forget about Baird. But he learned a truth that other naturalists had discovered: as one noted, "Few persons whom Baird ever got hold of escaped him afterward."

"You may think me a persistent correspondent," Baird wrote ingenuously in 1864. Could Grayson help him on a book he was doing about birds of Mexico and Central America?

Grayson was always looking for ways to get his paintings published. Full of guile, he wrote back, "Do you intend to illustrate your work? I have in my portfolio some very fine paintings of the birds of this country."

"I may have some illustrations," Baird replied cau-

Joseph Kastner is the author of A World of Watchers, *a history of the sport known as birding, from which "The sparrow wars" (November 1986) was adapted.*

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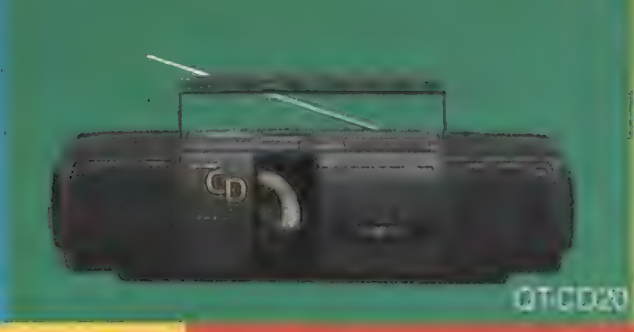

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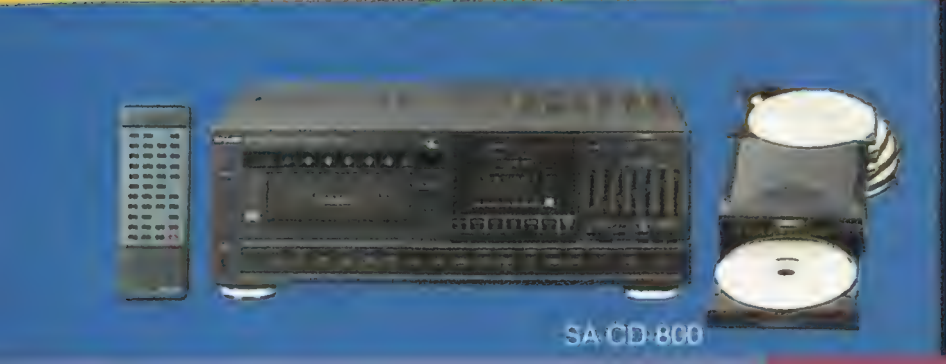

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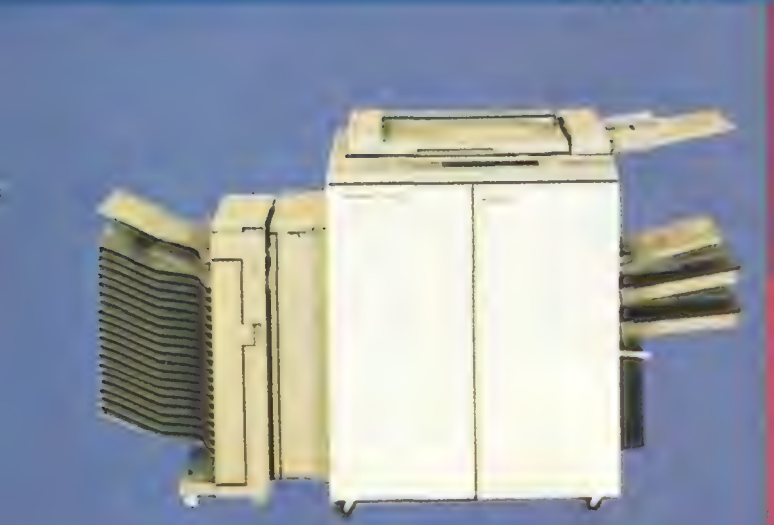

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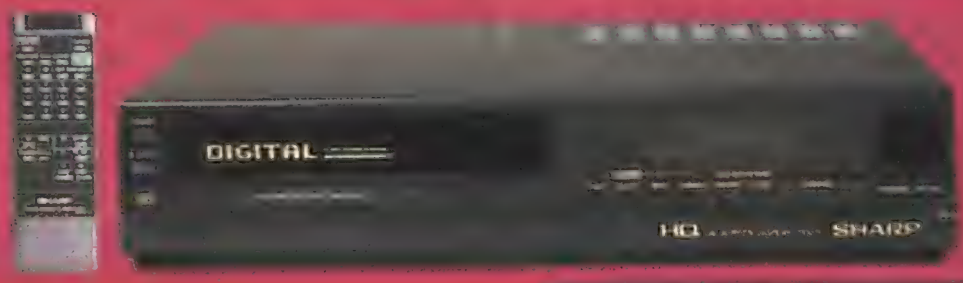

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tiously. "But I am not sure. . . . The expense of such work is so enormous."

For the next six years Grayson proved an industrious correspondent and contributor. The boxes of specimens he sent Baird piled up until, by 1870, they constituted two percent of all the Smithsonian's bird specimens—1,128 skins, 27 skeletons, 49 lots of bird's eggs and nests. Among them were 24 birds then thought to be new to ornithology, including the Mexican species of robins, towhees and grackles. His shipments were accompanied by scrupulously thorough notes. For example, on the crane hawk: "Plumage is a uniform slaty black with ashy reflections. Tail jetty black with two broad transverse bars of pure white . . . . Bill, cere and lores slaty black. Iris red. Tarsi and toes orange red. Nails black. Total length 19.5 in.; extent of wings 39.5 in.; wing 13.5 in.; tail 10 in.; tarsi 3 in.; toe 1.75 in."

The feelings he had for birds would sometimes interrupt these dutiful statistics. He would take time out to evoke a scene or a moment, as when his shot at an alligator in a Mexican swamp "awakened hundreds of echoes—the screams of water birds, the cackling of chachalacas, the *cap-cap-kee-op* of the little Green Heron, the hoarse cries of the Snake Bird and the dull *quock-quock* of the Boat-bill Heron." One sober listing, crammed with measurements, ended with the words "A sweet songster." There was hardly a bird he did not have a good word for. The crow "has faults," he once wrote, but quickly added "as who does not."

A close, long-distance friendship grew between Baird and Grayson though they knew each other only through scores of letters written in Baird's clear, hurried hand, in Grayson's bold scroll or in Frances Grayson's thin-nibbed Spencerian penmanship. Grayson kept after Baird for help in getting his paintings published. "Could you find . . . $3,000 to $5,000 in greenbacks?" Baird inquired once, after the topic had been raised. Grayson, of course, could not. "How in the name of the constellation of the southern cross am I to make such collections? I have no money," he wrote testily in 1865. "But it is a passion with me and I shall never leave it." He urged Baird to pay attention to his notes and specimens. "If you will take the trouble to look over them, you will soon see for yourself," he complained after Baird had confused a black hawk with a crab hawk.

Unable to send money, Baird had to find other ways of repaying his demanding collector. In a recent box of specimens, he wrote Grayson in 1865, there was a "beautiful rosy-breasted bird . . . of the genus *Granatellus*. I have ventured to name it after Mrs. Grayson." Thus the Tres Marías chat officially became *Granatellus francescae*.

"Could you not run over some time to the Tres Marías [islands] and make a collection of birds there?" Baird had asked, and Grayson, of course, had done so—a two-day sail over on a small boat crowded with peasants and their animals, and a trip back through a gale that split the boat's mainsail in two. Islands had their own hazards. On one, Grayson was attacked by "one moving mass of living crabs for miles in extent" that foraged for food in his hair and beard, and chewed up clothes,

Birding treks like this one by burro along the "Path of Skulls" in Mexico could be trying. Once, when bandits held up his coach, he saved his purse by dropping it into the bosom of a young nun in the party.

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In return for specimens, the Smithsonian's Secretary, Spencer Baird, sent moral support—but little money.

blankets and specimens as they went. Once, sleeping under a sheltering tree, members of his party woke to find themselves blinded by milky sap that dripped into their eyes. On another island, they were led to water by a tiny bird they saw flying into a hidden spring—"a finch of the genus *Pipilo*," Grayson noted, anxious to give proper credit to his helpful friend.

By late 1865 Grayson had news for Baird. "I have been invited to place my portfolio before the Mexican Academy of Sciences.... Maximilian greatly favors such matters." And so he and Frances went off to see the emperor and empress, who had been recklessly placed on the Mexican throne by the ambitious Napoleon III. On the way, bandits stopped their stagecoach, but Grayson cleverly saved his purse by dropping it into the bosom of a young nun in the party. In Mexico City, Grayson was granted an audience with Empress Carlota. "Very cordial," he found her, "graceful and good looking." She had the emperor look at Grayson's portfolio, and the Academy of Sciences commissioned Grayson, at a salary of $200 a month, to paint a hundred Mexican birds for a proposed four-volume work. On the way home, the happy Graysons were again held up by bandits. This time Grayson saved some belongings by giving the bandit leader a cigar.

When Napoleon III abandoned his puppet rulers in 1867, Maximilian was executed and poor Carlota went mad. The academy payments stopped. Grayson was now 48, and a feeling of desperation seemed to grip him. He rambled on about his life as a collector, calling it "my labor of love . . . now at the mercy of the waves in a small canoe, at other times floating amid the surrounding thick and tangled mangroves [and] tropical vegetation infested by ticks."

Still, with Baird's help, he had become an accomplished naturalist and, all on his own, a mature artist. What he'd once done from pure talent, he now did out of knowledge and craft. In 1868, working furiously, he finished 40 bird portraits. His instinct for composition and his sense of color lifted them above illustration to the level of art. Yet his paintings served, as good bird illustration must, to delineate and identify their subjects.

Subsidizing the Smithsonian

His mining projects kept failing and political unrest made it difficult to conduct any other business. Birds drained his money—Frances pawned a gold chain to pay for one expedition. By paying his own expedition expenses Grayson was subsidizing the Smithsonian, instead of the other way around. When he started selling some of his specimens to other ornithologists, Baird finally sent him $200, the first payment the Institution made to him.

Grayson never got to use it. Coming back from an island expedition with a good haul of seabird eggs, he suffered a recurrence of yellow fever contracted on those earlier bird forays. This time, in August 1869, it was fatal. On his deathbed, as Frances Grayson wrote Baird, her husband told her: "Mark these eggs." He wished to have a "post mortem for the benefit of science. I told him he had done enough for science."

To get his paintings published became his widow's crusade. After ten years of trying, in 1879 Frances Grayson gave the paintings to the University of California at Berkeley. They stayed there until 1948 when Lois Chambers Stone, a naturalist and artist who was writing a biography of Grayson, found them and began a long crusade to give him the credit he deserves.

Today's applause, of course, came late. But Andrew Jackson Grayson had already received the special reward that some field naturalists used to feel as they paused in their work of skinning and studying and classifying to look with a kind of awe at the world they had chosen to study. "It does really seem to me," Grayson once told Baird, "that when my spirits become the darkest, something comes in like a bird with glad tidings whose melody, often . . . has given me a greater love for my Creator whose works shine forth in all things . . . so beautiful and mysterious."

Boat-billed heron, an adult male, was given a lush setting, complete with caiman on far shore. Grayson, who hated to say anything derogatory about birds, had to admit the heron was "uncouth in appearance."

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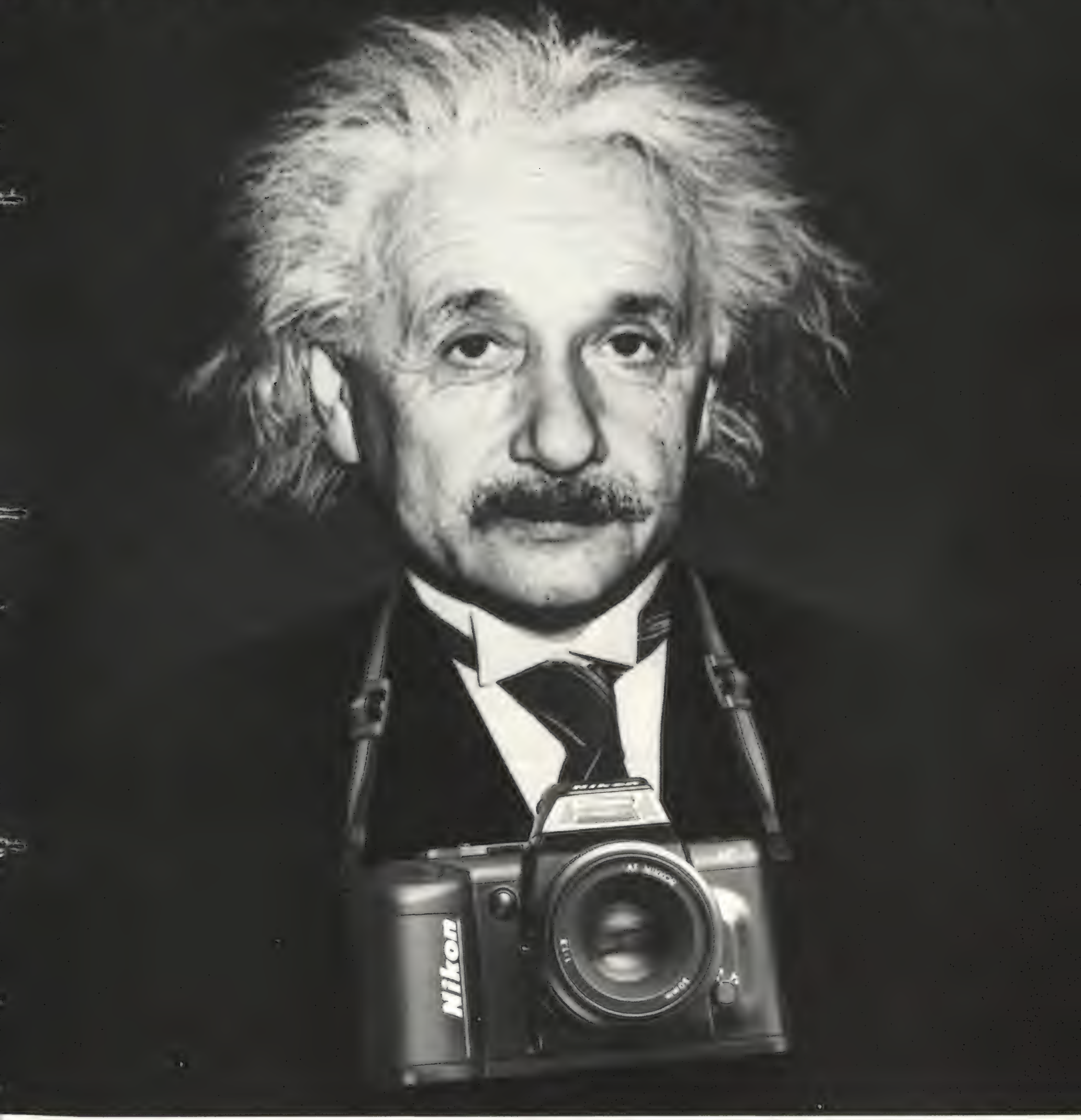

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Its appearance is what we first notice about skin, especially the pigmentation, here localized as freckles.

By Albert Rosenfeld

Some of a body's crucial functions are only skin deep

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Our image of the human body is largely defined by what we can see in the mirror, what we can touch with our hands: not heart or brain, not lung or liver, nor even muscle or bone—but our skin.

When artists depict us and novelists describe us, they dwell on our form, our surface features, the convoluted contours of our visible, palpable hide. Thus Desmond Morris could fairly describe us as *The Naked Ape*. We lack the scales of fish and the feathers of birds. We sport body hair, true, but not the furry mat that covers most other mammals. Our skin is the emblem of our humanity.

It performs for us what British zoologist J. Z. Young once set forth as the main task of living organisms: to "prevent their dissolution into the surroundings." Were it not for the skin, observes David R. Bickers, head of the dermatology department at Case Western Reserve University in Cleveland, the human organism "would rapidly equilibrate with its environment"—a situation, he adds, that is "not compatible with life." The bottle that contains us has to be porous and yet, at the same time, reliably leakproof, awash as we are in vital fluids that never hold still.

Apollo knew what he was doing, then, when he separated the brash young Marsyas from his skin as punishment for daring to challenge the god to a musical duel. So did the ancient Assyrians, among whom flaying was a favored means of executing captives; Ashurbanipal had the defeated Elamite general, Dananu, peeled like an apple.

We have traditionally regarded skin as a passive rind, an integument that holds us together. Considering that it has always been right there on the surface, as readily accessible for study

(and noninvasive study at that) as anything could be, one would think that by now medical science would have learned all there is to know about it. Not so. Doctors have indeed known for a long time that the skin has other functions. Yet discoveries over the past few years have forced us to acknowledge how astonishingly little we have understood about this convoluted body stocking we wear so casually. Our skin does things for us we never dreamed of. Today we are right in the middle of what could justly be called a dermatological renaissance.

Bickers is among the group of researchers who have come to view the skin as a dynamic, versatile organ, replete with unsuspected powers and duties. It is old news, of course, that the skin uses the sun's ultraviolet light to transform a molecule already in the skin into vitamin D, essential for proper bone development. What is new is the realization that the skin actively processes drugs and other chemicals just as the liver does and that the skin is a major player in the body's immune system as well.

And while the biochemists and molecular biologists are turning to the skin as a frontier of basic research, dermatologists are struggling to get out the message that the same sunlight that produces a fashionable tan in Caucasians not only causes cancer but also the blotchy, saggy, wrinkled, yellow skin we associate with age. It would seem we all, scientist and layman alike, have a lot to learn about skin.

The surface area of the average human body is roughly two square yards. The skin's firmest fit is around such places as the scalp, the ears, the palms of the hands and the soles of the feet. It is looser elsewhere, with a generous amount of give around the abdomen, for instance, and is pleated for flexibility around the knuckles, knees and elbows. It weighs somewhere in the neighborhood of nine pounds, depending on the size and heft of the original owner.

The skin is a finely laminated coating (p. 164); its layered nature has inspired comparisons with onions, croissants and baklava. Of its three major layers, the deepest is the hypodermis, or subcutaneous tissue, the fatty, insulating cushion not everyone classifies as part of the skin proper. The layer above it, by far the thickest, is the dermis, dense with collagen, elastic fibers and other forms of connective tissue that enable it to serve as the structural foundation for the whole skin. Because the dermis also provides feeding and other services for the topmost layer, it contains in its jungly thickets all the blood vessels and nerve endings as well as the sweat glands and hair follicles.

Martyred Saint Bartholomew holds his flayed skin; face is Michelangelo's.

The epidermis, the skin's almost-transparent outer layer, is where most of the newly discovered metabolic and immunologic activity takes place. It may be as thin as two-thousandths of an inch (over the eyelids) or as thick as one-sixteenth of an inch (on the soles of the feet). This fine layer, itself multilayered, has remarkable qualities. It has to be—and is—tough enough to be impenetrable to most substances and ordinary pressures. It is squamous (scaly), keratinous (horny) and full of dead cells, enormous quantities of which come off with a brisk after-shower toweling. (Sometimes they come off the scalp in the larger flakes of dandruff.)

Yet instead of being hard and dry, the epidermis remains soft and pliant to the touch. It can retain this suppleness because it is lubricated with an ever-so-thin coating of a greasy material (mostly fat) called sebum, which is produced by, naturally, the sebaceous glands. These glands are most plentiful in the face, scalp, chest and upper back—which is why acne, essentially an inflammation of the sebaceous glands, rarely appears on the arms, legs or abdomen.

This outer layer of the skin is far from uniform. It has at least two sub-

Science writer Albert Rosenfeld is an adjunct professor at the University of Texas Medical Branch, Galveston.

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layers, the lower one containing the pigment-forming melanocytes, and in some parts of the body as many as four sublayers. The epidermis is constantly regenerating itself: all its cells turn themselves over every 28 days or so. Dead cells are being steadily sloughed off as new ones push up from the deeper layers in a never-ending process of cell division. It takes about 14 days for the newborn cells to make their way to the outer layer of the epidermis, so they have only another 14 days of life left by the time they are in place. The skin we actually see, then, no matter how glowingly supple the surface may appear to the poet, is in fact a shedding crust of dead and dying cells.

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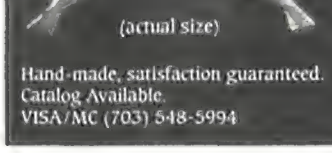

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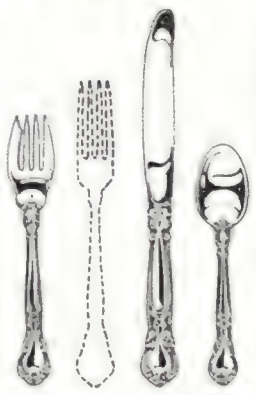

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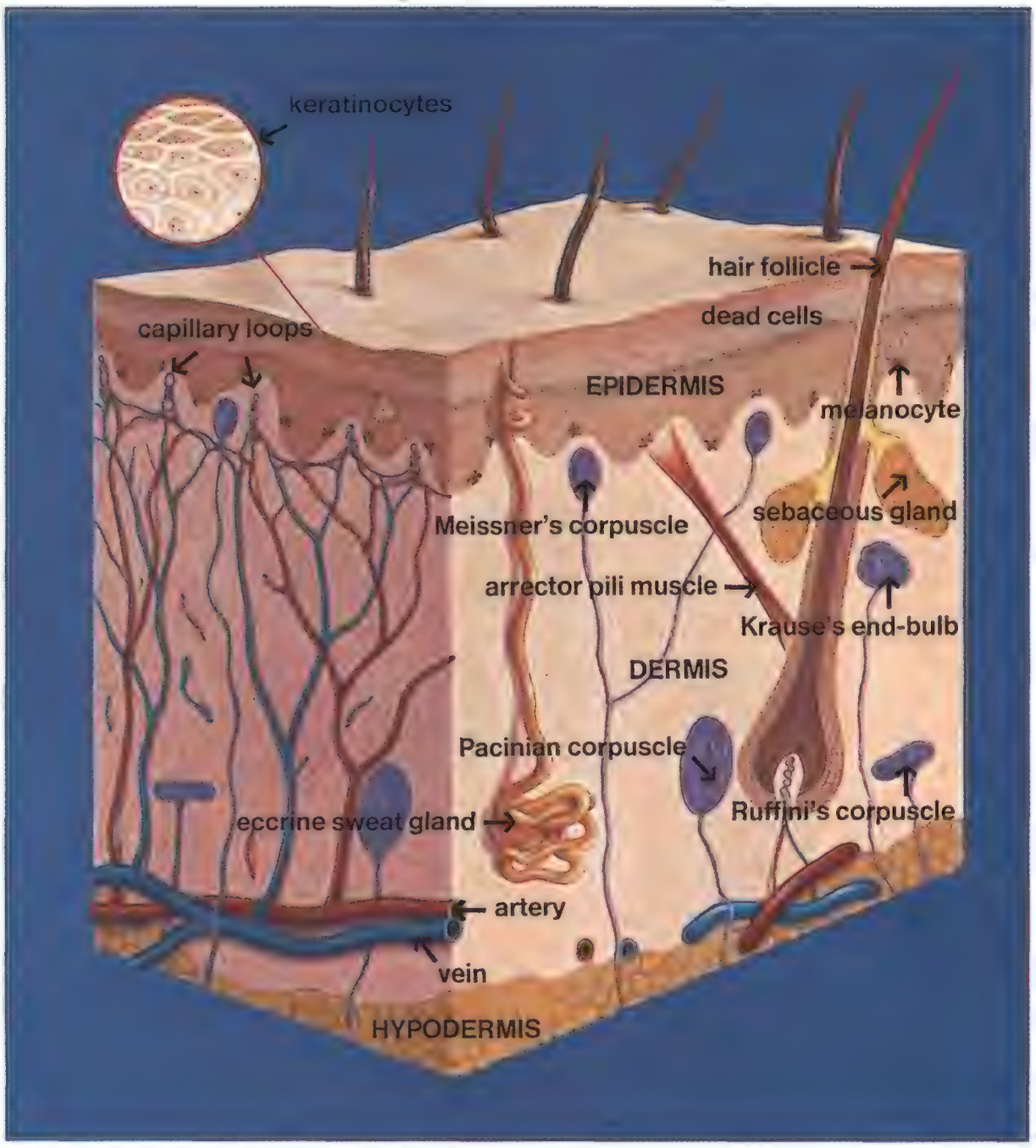

This section of skin packed with nerve endings is typical of the palm of the hand. Meissner's corpuscle is sensitive to a light touch; the Pacinian to heavy. Ruffini's corpuscles sense heat in one temperature range while Krause's end-bulbs work in another. Enlarged area in circle shows keratinocytes flattening and filling with keratin as they move to skin surface.

Pigmentation is complicated and it is in pigmentation that the human races vary the most. Dermatologists classify skin into six groups that range from the fairest of the fair, who in one hour of springtime sun will always burn, to those with very dark skin who will not burn in that same hour. Carotenes add a yellowish component (Orientals have an abundance of carotenes) and hemoglobin adds a pinkish tinge to the complexion of some very fair-skinned people. But the major pigment is melanin, manufactured by the melanocytes. The intensity of skin pigmentation depends not so much on how many melanocytes are present as on how much melanin each cell makes. Human races do not differ very much in their melanocyte numbers; the individual cells in darker-skinned people are simply much more prolific in their melanin production. In albinos, a genetic defect shuts down production altogether. Even in the same person, pigment cells vary widely in their production, the more active ones producing freckles and "age spots," which intensify in sunlight.

For the most part, skin is skin, and while black skin does vary somewhat

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physiologically, by taking those variations into account, findings based on one color of skin generally hold for all skin colors.

It is clear that for light skin the sun is enemy number one. Sunlight not only causes skin cancer, but we now know it accelerates and accentuates all the sagging, wrinkling and yellowing of the skin we associate with age. "Despite all the warnings," says Rockefeller University's D. Martin Carter, "people who like to get tan simply refuse to take sunburn seriously enough. . . . the redness represents *injury*—damage that will accumulate over the years. It's why skin cancer is the commonest of malignancies. True, in the tanning process, the sun activates the melanocytes to manufacture and release more melanin, which does offer some protection. But by the time the melanin works its way up to the surface, much of the burning damage may already have been done." A tan is not perfect protection—sunlight will still do damage—and will itself cause the skin to become dry, tough and leathery, and to look old prematurely.

Delicate nerves in the fingertips make it possible to read Braille characters.

Virtually all dermatologists echo these sentiments. "Sunlight, owing mainly to its ultraviolet component abetted by infrared radiation, is a notorious enemy of good skin," says Albert M. Kligman of the University of Pennsylvania in a paper he coauthored with Arthur Balin of Rockefeller University. "Practically all of the dreary stigmata registered on the 'old' face are sunshine induced. . . ."

Kligman and Balin are refreshingly candid on how much we have to learn about how the damage is done: "The wrinkle, the most telltale sign of aging, is still unexplained! Its anatomy does not distinguish it from surrounding tissue."

Under the steady pull of gravity, wrinkling goes on all through life as we smile or frown, squint or grimace, chew or weep, laugh or look quizzical, gargle or swish the toothpaste out of our mouths. As the skin begins to lose its elasticity, the lines that result from, say, sleeping with the face on a wrinkled pillow, take longer and longer to go away; eventually they just stay. Connective tissue beneath the skin

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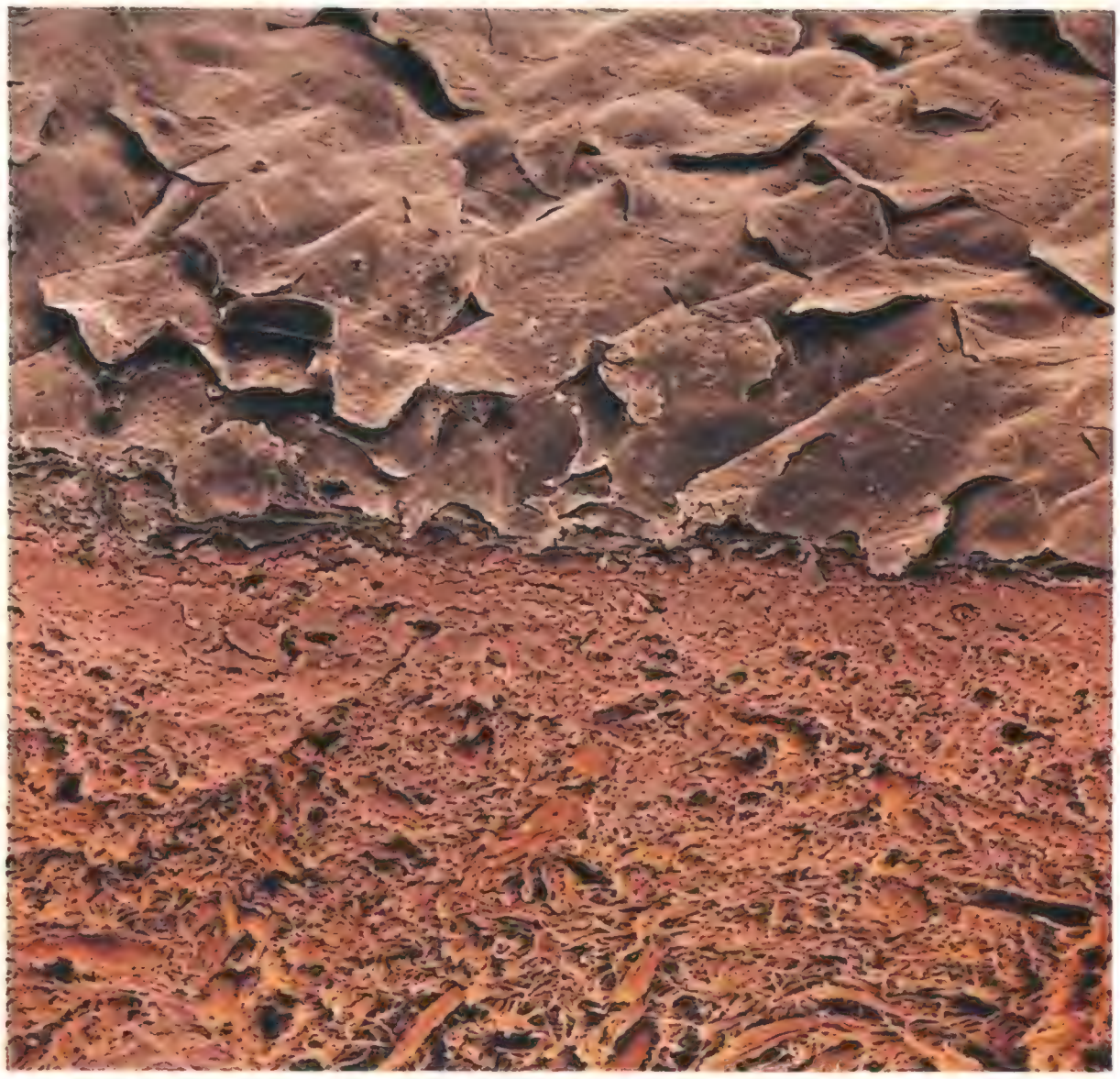
stiffens or breaks down, and some just disappears, as does some of the supportive fat. In this gradual structural collapse the skin becomes floppy and dewlappy.

Earlier this year a 17-year-old acne cream made the headlines and the comic pages—and sent thousands of people to their doctors—when a medical journal reported that the cream reduced fine wrinkles and muted the color of age spots (p. 178). The active ingredient is tretinoin, a vitamin A derivative, sold commercially as Retin-A. It is not clear yet how the cream works or what its long-term effects will be. Some dermatologists believe that the cream may do other things, such as eliminate precancerous cells, increase collagen and blood vessel formation and increase the rate at which dead cells are shed. (At least part of its cosmetic benefits may simply result from an irritation that causes dead cells to slough off faster.) But other dermatologists warn that these findings are only preliminary and have not been scientifically validated. One researcher, Stuart Yuspa at the National Cancer Institute, advises caution. "Applying vitamin A to the skin alters many of the proteins in the skin and some of these may be important in protecting us against the ill effects of sunlight."

As we grow older, besides wrinkling, the skin becomes thinner. Blood does not circulate as well within it. The number of immune cells in the skin (more about them later) declines. And, in what might seem like a blessing but decidedly is not, sweat glands produce less. This last is serious because sweating is a principal way for the body to excrete waste and to regulate its temperature.



With a magnification of 440, this hand-colored scanning electron micrograph shows the layer of flat dead cells on skin surface.

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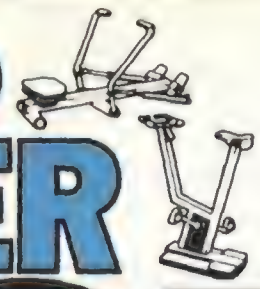

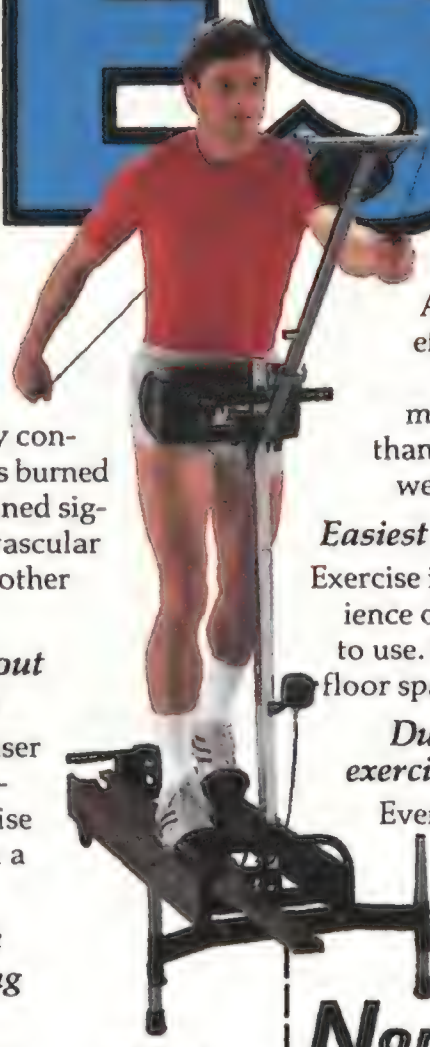

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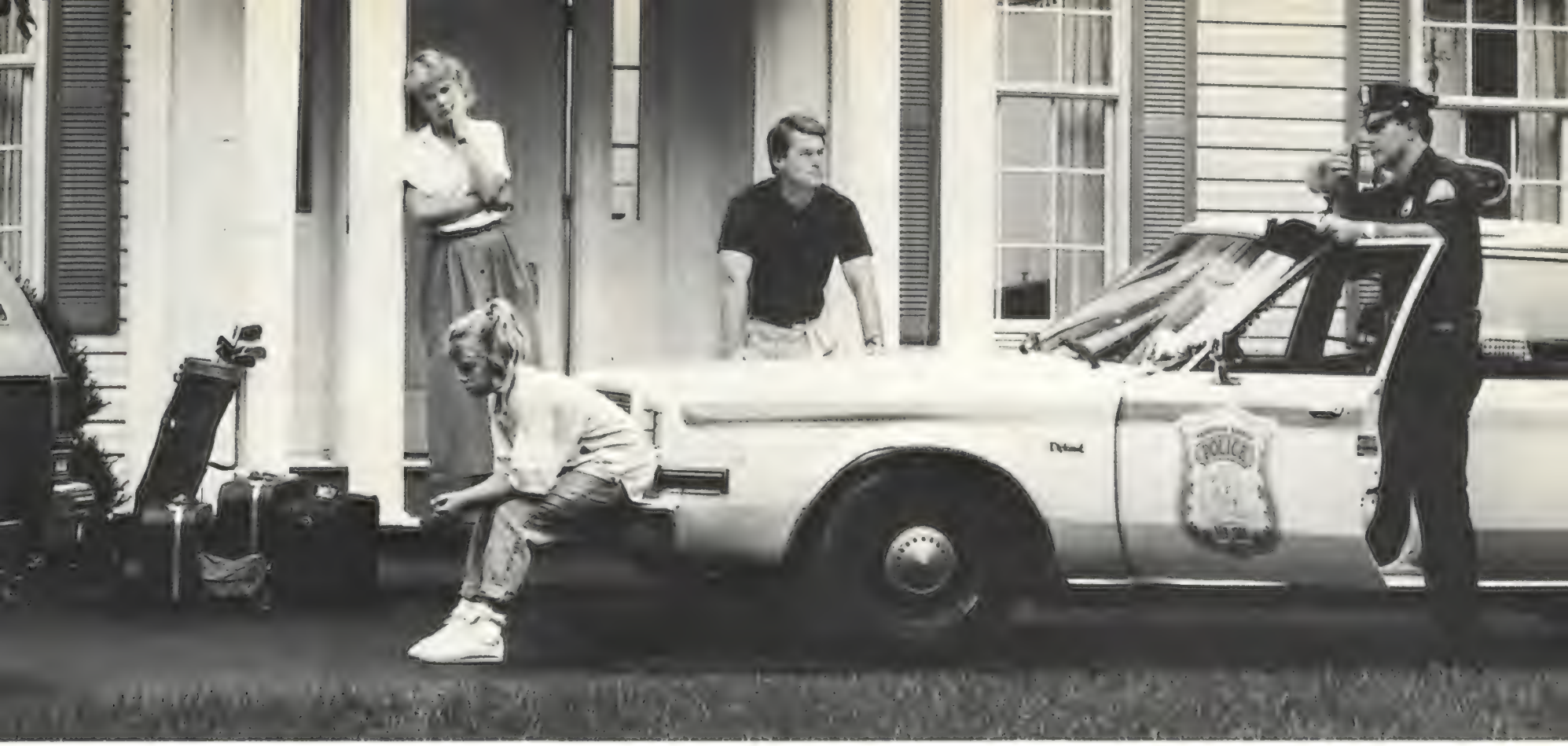
A healthy adult on an average day will produce about 1⅓ pints of perspiration (mostly water, with small amounts of salts and waste products). Under heavy exertion in warm weather, the same individual might sweat a couple of gallons. This all happens through three million sweat (or eccrine) glands that channel their fluids through pores which are separate from the hair follicles. Specialized sweat glands (the apocrine glands, sometimes called scent glands) are responsible for the "body odor" that in our society we find offensive. They are concentrated mainly in the underarm and genital areas which, because they are hairy, warm, moist and protected, are favorite swarming grounds for certain bacteria. The oozy substance that the apocrines secrete is itself odorless, but its interaction with the microbes in residence is what makes us reach for the deodorant.

The skin plays host to enormous populations of microorganisms. Dwelling on the healthy epidermis are many species of bacteria, along with occasional yeasts and fungi—and even a real animal, a mite called *Demodex folliculorum* because it favors certain hair follicles on the face, particularly the eyelashes and nostril hairs. There have been some valiant attempts to count skin microbes, but reliable numbers are still not at hand.

The sweat glands and blood vessels play a major role in keeping the body's internal temperature stable. As warm-blooded mammals we must keep that temperature within a very narrow range no matter what the weather may be outside. A hot line between the skin and the brain's thermostat in the hypothalamus is crucial to success.

There are really two separate pathways between brain and dermis used to bring the body's core temperature back to normal. When you are too hot (with a fever, for example), the hypothalamus activates a chain of signals that result in a much increased flow of blood through the skin and a



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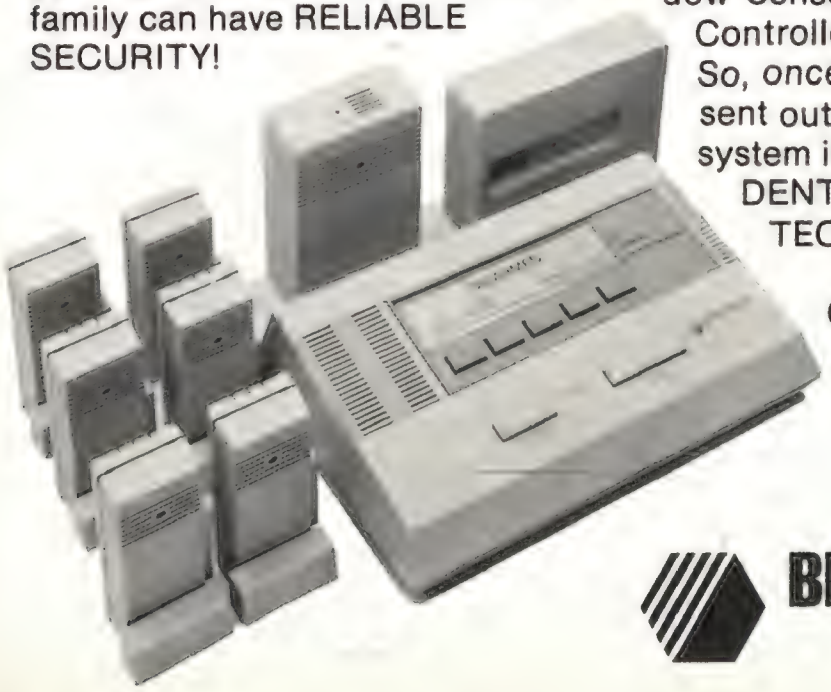

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flux of sweat out to the skin's surface. As the sweat evaporates, it cools the skin, which in turn cools the blood running past it—much as your car radiator cools the water running through it. When the temperature returns to normal, the hypothalamus shuts off the cooling cycle. If, on the other hand, your temperature drops too far, the hypothalamus uses the alternate pathway, reducing blood flow to the skin (reducing sweat as well) to keep the vital innards warm. Here the skin's own welfare is sacrificed, even to the point of allowing frostbite to occur.

The skin, of course, routinely monitors the outside temperature and reports any changes to the brain. But the busy hot line between skin and brain carries messages about more than just temperature. We can count on it to let us know what is wet or dry, hard or soft, rough or smooth.

To do all its jobs, the skin is crowded with receiving and sending apparatuses. To begin with, it is everywhere laced with naked nerve endings, more in some places than in others. The sensitive parts of the hand contain more than 1,300 in a square inch. Additional nerves are modified with bulbs and corpuscles to make them specifically sensitive to heat, cold, pain and pressure.

Working out such fine anatomical details has taken researchers until relatively recent times. The major surprises were still to come. The techniques of biochemistry and molecular biology are what brought skin research forward from simple inspection through a microscope to today's dermatological renaissance. We now know that the skin is both a key element in the immune system and a chemical conversion factory that rivals the liver. This latter activity—the biotransformation of chemical compounds—is known as cutaneous pharmacology. Take cortisone, for example. It is an anti-inflammatory, and it makes sense to apply it to inflamed skin—but cortisone itself would have no effect. What happens is that the skin changes it to hydrocortisone, which does work.

Like all hair, Crystal Gayle's is made of keratin, as are rhinoceros horns.

The skin can modify all kinds of compounds that come into contact with it. A virulent, cancer-causing chemical can land on the skin and, as it begins to penetrate, epidermal enzymes simply break it down into harmless constituents.

One of the skin's most unwelcome surprises is that its biotransformations do not invariably detoxify. In some instances the skin's enzymes latch onto an innocuous compound and transform it into a carcinogen! Benzopyrene, a hydrocarbon produced during the incomplete combustion of coal and heavy fuel oil, is among the more notorious of environmental carcinogens. Yet it would be harmless were it not for the presence in the epidermis of an enzyme that converts it to a sinister byproduct that penetrates cells and modifies their DNA causing them to become cancerous. "One wonders," says David Bickers, "whether it takes not just sunlight itself to cause a skin cancer, but an added insult from some chemical like benzopyrene."

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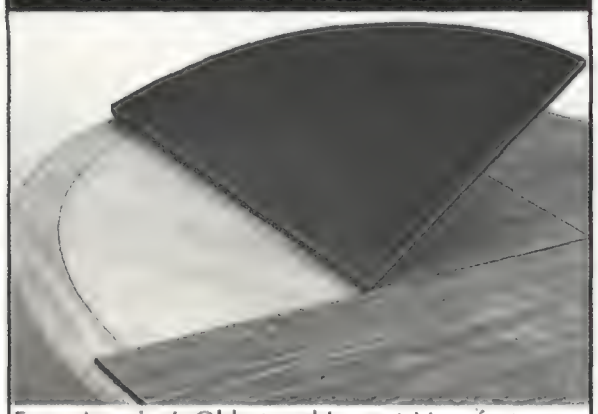

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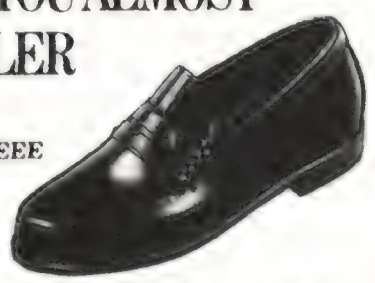

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Bickers and his colleagues, Mukal Das and Hasan Mukhtar, are learning to subvert the "traitor" enzyme with naturally occurring substances found in various nuts and vegetables as well as in tree bark. "This gives us hope that a dietary approach to these cancers might be feasible."

News of their work caught the attention of a Chinese investigator, Wang Zhi-Yuan. He had observed that in certain regions of China—regions whose inhabitants drink large quantities of green tea—the incidence of skin cancer seems much lower than average. Wang has now come from the People's Republic to work with Bickers' team in Cleveland, much of his baggage space taken up with varieties of green tea to test.

Bickers points out that scientists are learning to amplify the effect of protective enzymes as well as to subvert harmful ones. They can cause an enzyme to be produced in larger than normal amounts, and can even induce the manufacture of other enzymes normally not found in the skin at all. Bickers says it is theoretically possible to devise lotions that would induce the production in the skin of enzymes that would break down any toxin, including those released in industrial accidents.

The prospect of beefing up the body's chemical defenses must intrigue clinical investigators. They are already turning to the skin as the preferred route to the interior. Anything that can be made to penetrate the epidermis and reach the dermis, with its rich supply of blood vessels, can enter the bloodstream directly. It does not have to be injected, and it does not have to be taken orally and thus processed through the gastrointestinal system and the liver.

The potential for such transdermal drugs is currently limited by the size of the molecule that can be absorbed through the skin. But plenty of molecules are small enough, including some that would be dangerous if taken orally. Recent shipboard travelers will have seen, for instance, those little circular patches worn behind the ear: the result of pharmaceutical technology that uses, in this case, the "truth drug" scopalamine. When passed continuously through the skin in minute quantities, it is not only harmless but becomes an effective remedy for motion sickness.

A number of such drugs are already on the market. The trick, according to David Bickers, is to devise nontoxic vehicles; the motion-sickness patch may look as simple as a Band-Aid but actually requires sophisticated engineering. Ways have been worked out to deliver by patch everything from female hormones to nitroglycerin for heart patients (below).

The skin's immune functions turn out to be related in many ways to its metabolic capacities. In both, enzymes often make the critical difference. The well-known poison ivy rash, for example, is an allergic reaction—or, in different language, an immune response. The body is defending itself against a threat. (It just so happens that the guilty chemical, when isolated, will not by itself cause poison ivy. As in the case of benzopyrene, the allergic or immune response does not occur until the skin's own enzymes come into play.)

The triggering—or in some cases the defusing—of the skin's immune cells is of special interest to another

In this heart patient's skin patch, the medication is mixed with the adhesive.

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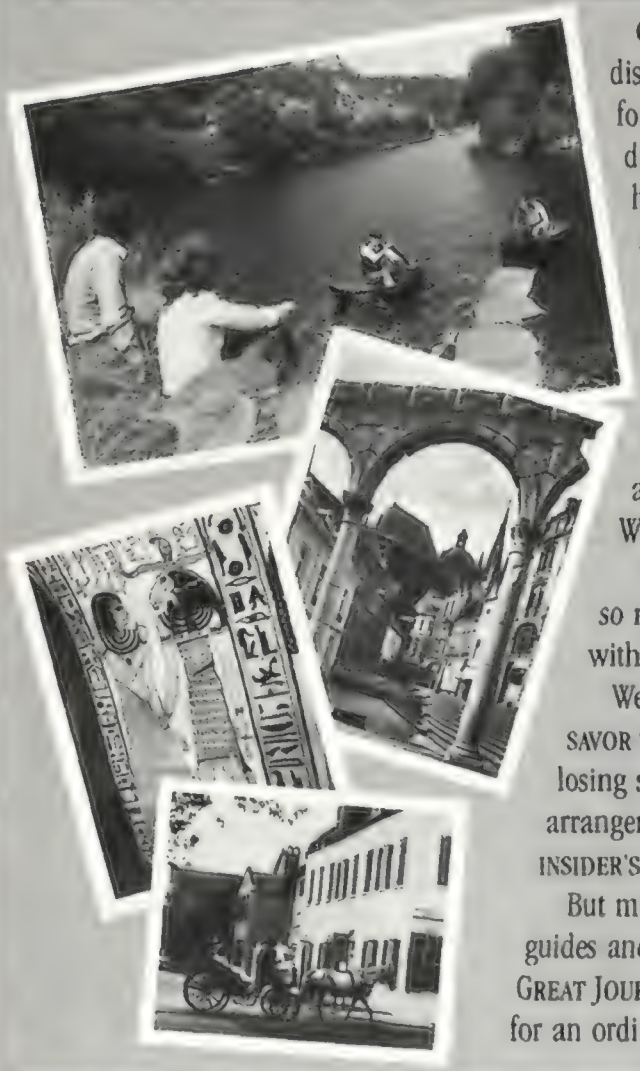

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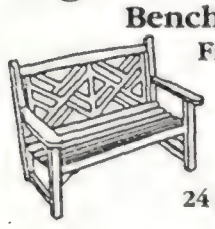

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Bickers colleague, Craig A. Elmets. When Elmets was still at the University of Texas Southwestern Medical Center in Dallas, he was part of Paul Bergstresser's team that was studying ultraviolet B (UVB), the segment of sunlight implicated in skin cancer. They discovered that apart from the direct damage that UVB inflicts, it also impairs the skin's immune cells, which normally would be expected to detect and destroy incipient tumor cells. UVB does not appear to knock out the cells themselves, but it does distort normal immune responses. Elmets wants to know how the UVB does this, and how immune cells might regain their combat status.

"It seems clear that we are just beginning to appreciate the extent and importance of immune activity in the skin," says Bergstresser, who heads the center for immunodermatology. "Yet it's only fitting that the immune function—which is the body's way of distinguishing the self from the nonself—should be strongly represented in the organ that is most directly responsible for physically separating the self from the nonself. I think the skin not only provides immune protection for its own tissue, but plays a role—a role we don't understand very well—in protecting the whole body."

Yale University's Richard Edelson agrees. "The latest evidence strongly supports the notion of the skin as an integral component of the human immune system. It's been demonstrated, for instance, that a large dose of UVB (larger than you're ever likely to get from routine sunbathing) applied to animal skin significantly affects the immune capacity of the spleen. In a number of diseases, what we do to the skin may have a measurable impact on other parts of the body."

Now that we are looking at the skin as part of the body's immune system, we are seeing more and more. The skin has in it Langerhans cells that seize invading bacteria while they signal T-cells to come and destroy them. T-cells, the white blood cells

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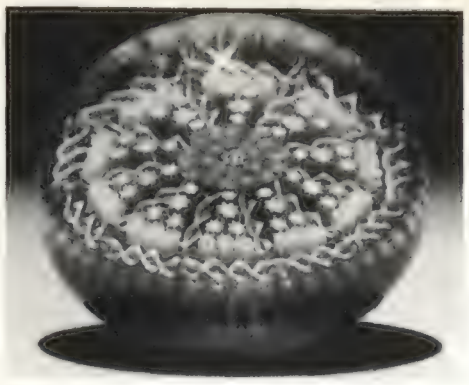

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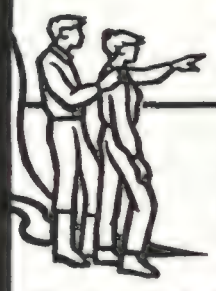

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more properly called T-lymphocytes, are the chief cancer fighters of the immune system, and the skin has a considerable population of them.

"In the past," says Edelson, "when you looked at a skin biopsy, you didn't pay much attention to the sparse scattering of T-cells you saw. They were presumed to be transient passengers. Now we know that these T-cells are not random travelers. After they have been formed in the bone marrow and processed by the thymus, these T-cells home in specifically on the skin, as if they knew their address. If you count those cells in a tiny biopsy, and extrapolate from there to account for the entire surface of the body, you'll realize that the number of T-cells at any given time is enormous—perhaps as many as are carried in the bloodstream itself!"

Most striking of all is the discovery

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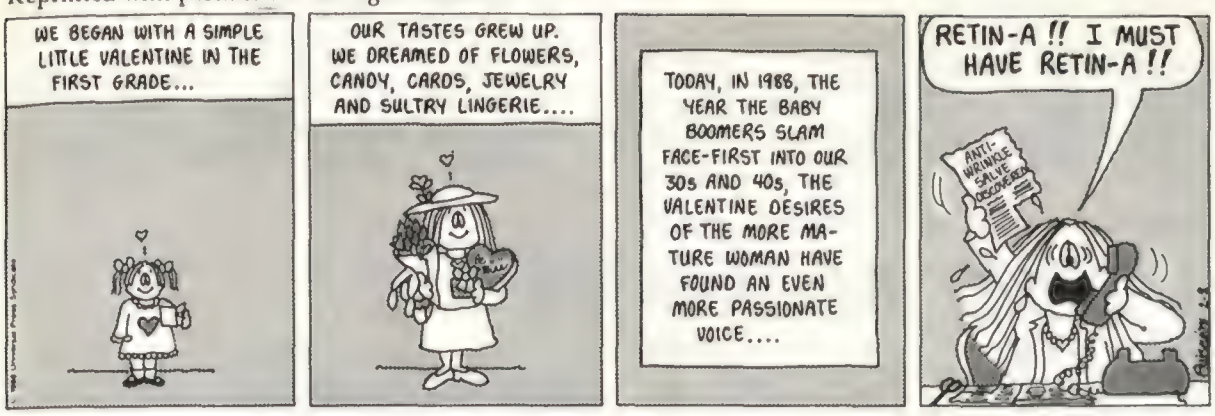
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The comic strip *Cathy* captures the frenzy of public demand for Retin-A, but some doctors advise the public to await further testing.

that the cells on the surface of our skin, once thought to be a purely passive defense against the outside, play a major role in the functioning of the immune system. These surface cells are called keratinocytes because they produce keratin, a protein whose molecules link together closely to form a tough, pliable, waterproof membrane covering our bodies. By the time these cells die, they are composed almost entirely of keratin. (It is also the stuff of our hair and nails and the horns, hoofs and claws of other animals.)

Now we are finding out that these simple keratin-producing cells are important to the entire immune system. They produce a hormone that enhances the growth and development of T-cells, an ability once thought to be an exclusive property of the thymus. They also synthesize a substance called interleukin-1, an ability once thought to be the sole province of white blood cells. Interleukin-1 triggers the T-cells to make a closely related molecule, interleukin-2. This step in turn is the signal that starts mass production of a special breed of T-cells called helper cells, one of whose jobs is to induce other cells of the immune system to start manufacturing antibodies.

So here is the familiar skin cell—before it pushes up to the top, where it gets brushed off by your towel—initiating the series of events that leads to antibody production. What an astoundingly busy little factory it turns out to be. It may, Edelson believes, render the epidermis the richest source in the body for the production and dissemination of helper T-cells, or at least the factors that en-

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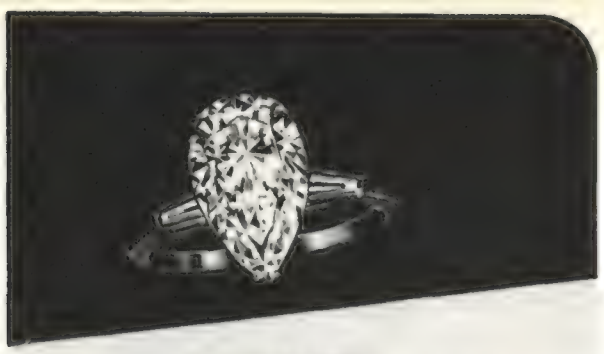

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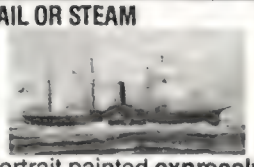
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hance their growth and reproduction.

Intensified study of the keratin-producing skin cells has begun to show just how much wasn't understood about the skin. Take keratin itself, the abundant protein in epidermal cells. Where it was until recently deemed to be a single substance, keratin has proved to be an ever-enlarging family of molecules.

With surprises from the skin coming so fast, researchers like Bickers, Bergstresser, Edelson, Carter and Balin believe it would now be surprising indeed if more surprises were not in the offing. "Consider," says Edelson, "that circulating in the healthy skin at any given time is about 25 percent of the body's blood supply. It is obviously an extremely active tissue, and the body recognizes its importance by keeping it well nourished.

"Look at what we ask of the skin," Edelson continues. "We take for granted that it will carry out its function as a barrier against a host of dangers. We count on it as a major enhancer of our attractiveness: in fact, that's probably what gets most of our attention. But as the skin does these things for us—while, incidentally, remaking itself every 28 days or so—it is at the same time coordinating and orchestrating on our behalf an incredibly complex array of activities. And what a juggling act it is! What a performance! It surely deserves some equivalent of the Academy Award."

A dead skin cell comes to its end inside a dust bunny that is made up of blanket fibers from a bedroom floor (the colors were added).

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By Bob Bergland

America is looking for answers to tough economic problems.

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Book reviews

The Devil and Dr. Barnes: Portrait of an American Art Collector
Howard Greenfeld
Viking, $19.95

Most Americans interested in art undoubtedly think they know all they need to know—all they care to know—about the terrible-tempered Dr. Albert C. Barnes, the great collector of modern art, art that he installed in his tutorial establishment in suburban Philadelphia.

Most Americans are wrong. There is a fascinating story about the late Dr. Barnes, and Howard Greenfeld tells it fully for the first time.

We learn, for example, that Barnes did not invent Argyrol, the best-selling antiseptic from which he made the fortune that financed his dazzling collection of French and American paintings, at one time said to be hidden away in Merion. (It is no longer hidden away, Greenfeld assures us: access is easily, routinely, obtained by writing ahead or simply by showing up.)

Greenfeld seems to denigrate Barnes for not having invented the nostrum but having claimed for years that he did. In fact, he was to do something far more important. Actually, he did invent Argyrol in theory. He knew what he wanted and in 1902 went into partnership for its invention and promotion with a German chemist he had recruited for their mutual employer. The German did the inventing, Barnes the promoting. However, instead of the presentations to druggists that were then customary among hundreds of patent-medicine purveyors, Barnes, for the first time in the industry, made his presentations to the doctors. He thus became the first pharmaceutical "detail man" and inaugurated the practice upon which is based today's billion-dollar trade.

Revelations abound. Albert C. Barnes became the friend and, at once, patron and protégé of John Dewey, acknowledging in his own teaching the great teacher's inspiration, and receiving thanks for Dewey's knowledge of art.

Barnes' first great chum in art was the Ashcan painter William Glackens, who made the initial, vital buying trip to Paris for Barnes. The last such chum was actor Charles Laughton, who had a room at the Barnes country home.

The reason for Barnes' bad reputation was not just that he totally repudiated the art establishment of his day, preaching that art was for everybody and that he could teach everybody to appreciate it and profit from the experience, but that these beliefs drove him to and beyond the edge of acceptable behavior, often far beyond "appropriate response" in dealing with slights real and fancied, provoked and unintended. That consistent reaction, called "the devil in Dr. Barnes" by Greenfeld—and perhaps what Milton meant by the "sense of injured merit"—led Barnes to write scurrilous letters to art historians and museum directors.

With his alma mater, Penn State, and the Philadelphia Museum of Art Barnes waged bitter, sporadic warfare, with no quarter asked, none given, interrupted by quiet periods, semitruce, even mistrustful alliance. It is a measure of the turmoil Barnes suffered and inflicted that he makes the legendary Philadelphia director Fiske Kimball seem a model of calm rationality, a view not widely held in Kimball's lifetime.

The details of all this are fascinating and lead to three conclusions, not necessarily those promoted by the author. First, Barnes' importance in medical history is enormous and unsung. As the first detail man, working the doctors' offices instead of the drugstores, he helped create the pharmaceutical medicine we benefit from today.

Second, as an art collector he had few peers in his speciality; like the Cone Sisters in Baltimore, he was decades ahead of the Museum of Modern Art in understanding Matisse, for example—who fully returned Barnes' respect. The paintings at Merion are vital to a full grasp of French art from, say, 1875 to 1950. They are now available. Do go.

In spite of his exaggerated gestures and imperial airs, Barnes' deprecation of the art establishment was a healthy antidote to the simple faith of true believers in anything they are told by an art magazine or museum.

Frank Getlein
Art reviewer for National Public Radio's *Performance Today*

Woman in the Mists
Farley Mowat
Warner Books, $19.95

As controversial, outspoken and prominent defenders of wildlife, Canadian author Farley Mowat and recently murdered American primatologist Dian Fossey were cut from the same irregular cloth. So Mowat was a sound choice to write a popular biography of the much-maligned and equally revered Fossey.

In two decades of passionate, pioneering research into gorillas, Fossey led a daunting and combative life.

There was much in that time for which she could be fairly criticized. She treated her hosts as inferiors, calling them wogs. In her own ever-more-obsessive battle against poachers she attempted to scare them away from the rare and highly endangered mountain gorillas on the two-mile-high slopes of Rwanda's volcanoes. She resorted to voodoo imprecations and when those failed, to roping and whipping poachers and burning their possessions.

Yet, as Mowat's unabashedly sympathetic portrait makes abundantly clear, such zealous vigilantism was grounded in the anguish Fossey herself had suffered in youth and adulthood and that she'd seen perpetrated against her beloved gorillas. Several were brutally killed by poachers, and the death of one particularly curious adolescent male, Digit, led to the founding of Fossey's organization, the Digit Fund.

Through a unique agreement with the fund and Fossey's mother and stepfather, Mowat and his research associate, Wade Rowland, enjoyed access to voluminous correspondence.

Mowat makes liberal use of Fossey's words, often set off in bold print, lending her own distinct voice to a remarkable series of midlife adventures. She emerges as mercurial, lusty, unstintingly generous to her devoted friends, venomous to her many enemies and rough speaking to all.

Fossey's parents divorced while she was young. She was raised in cold comfort by her mother and a stepfather she

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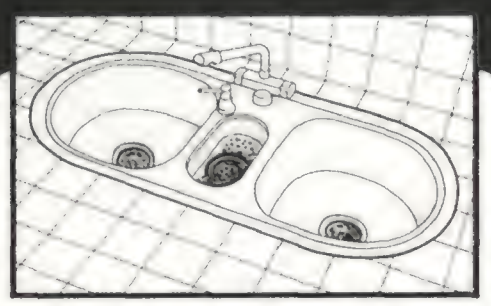

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never came to love. She showered her love on horses as a child, and on crippled children as a young woman working as a hospital physical therapist. In her youth Fossey had dreamed of going to Africa but was into her 30s before she actually went there. It was then that she resolved to work among the gorillas.

While Mowat provides little insight into Fossey's development and the effect upon her of her father's suicide while she was in Africa, her mistrust of authority, affection for the victimized, and stalwart independence clearly have their origins in her early years. Nor does he deal with the substance and initial purpose of her African sojourn, studying the ecology and behavior of the mountain gorilla. At times his writing is as breathless and disjointed as Fossey's own. There are lapses of scholarship—Geza Teleki is a good-humored man but he may not appreciate being called "another leading woman primatologist." And sentences occasionally collapse under the weight of clichés: "Under such sybaritic conditions, Dian succumbed to the romance of star-filled nights on the sweet-smelling savanna."

Mowat does devote considerable attention to Fossey's woefully declining health and tormented interpersonal relationships over two decades in Africa. Torn between her commitment to her work and her desire for husband and family, Fossey endured many on-again, off-again affairs, and brief, disappointing liaisons, including one with Dr. Leakey, in her vain search for companionship.

True to her conflicted nature, Fossey lived like a pauper, yet impulsively gave away money to friends in need. She suffered acrophobia, broken limbs, emphysema and a host of other, often life-threatening, afflictions. Fossey endured all these and continued to smoke, drink and consume junk food.

But as Mowat makes poignantly clear, Fossey went to the gorillas for sustenance in crisis after crisis. By the end she was crawling, pitching over in the mud, asleep from exhaustion, in her now-infrequent climbs up Karisoke to see the beasts.

Of one male gorilla's approach to her she wrote: "I slowly turned my hand over and let it rest on the foliage. Peanuts seemed to ponder accepting my hand. . . . Finally he came a step closer and, extending his own hand, gently touched his fingers to mine. To the best of my knowledge this is the first time a wild gorilla has ever come so close to 'holding hands' with a human being."

Fossey's death remains clouded. With her confrontational approach, likened by many to the bluff charges of the dominant male gorilla, Fossey had alienated so many of her students and Rwandan hosts that the list of suspects with motives reads like an Agatha Christie novel. An American student was charged in absentia by the Rwandan government, as was a gorilla tracker who, until a few months previously, had worked for Fossey. He hanged himself before the trial.

Mowat speculates that "influential people" who increasingly viewed Dian as an "impediment to the exploitation of the Park National des Volcans, and especially to the exploitation of the gorillas" hired or "suborned" an African with whom she was familiar to kill her.

Yet, as Mowat points out, his interest was in Fossey's life, not her death. Others will no doubt write a less-biased assessment of Fossey's contributions to conservation and science. Meanwhile, Farley Mowat has produced an account as contradictory, conflicted and fascinating as the woman herself.

Don Lessem
Massachusetts writer on nature

Oscar Wilde
Richard Ellmann
Knopf, $24.95

"The gods had given me almost everything," Oscar Wilde wrote from prison. "I had genius, a distinguished name, high social position, brilliancy, intellectual daring; I made art a philosophy and philosophy an art: I altered the minds of men and the colours of things; there was nothing I said or did that did not make people wonder." When the letter in which this passage appears was published, it was entitled *De Profundis* (out of the depths), for Wilde did indeed come to know both the heights and lowest levels of human experience.

A brilliant playwright, novelist, poet, critic and wit, Wilde seemed during the 1890s to be enjoying one literary success after another. Yet, just as *The Importance of Being Earnest* was creating a sensation in London, the foundations of Wilde's private life were crumbling, and within a short time he found himself imprisoned for homosexuality. "The left hand is the hand of a king, but the right that of a king who will send him-

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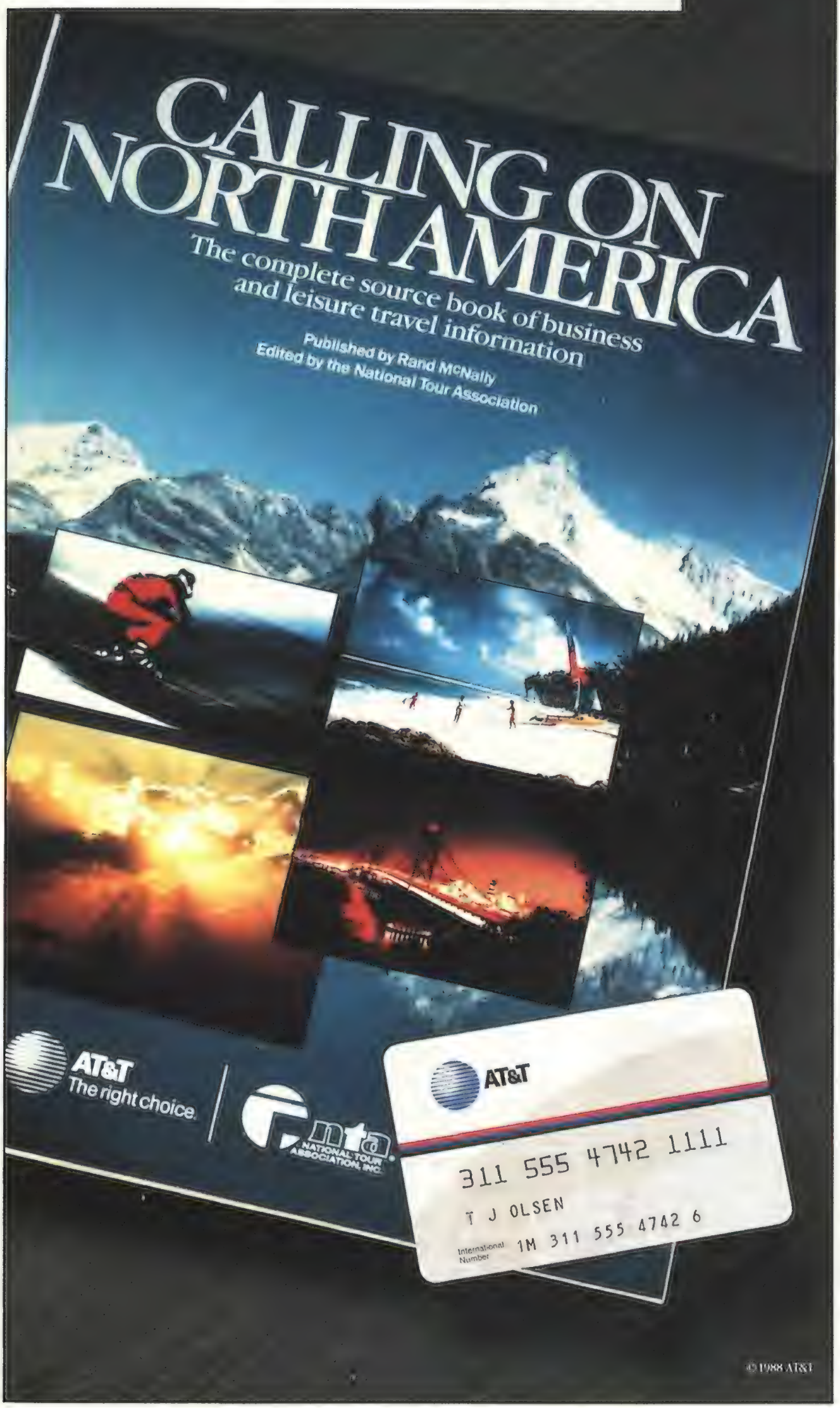

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self into exile," an astute palm reader had told him in 1893.

Both the works and the life of Oscar Wilde fascinate each new generation of readers, and at last we have been given a biography of him by one of the great scholars of our century, Richard Ellmann, Goldsmiths' Professor of English Literature at Oxford University and author of distinguished biographical studies of Yeats and Joyce, Ellmann died before the publication of *Oscar Wilde*, a fitting memorial to his investigation of the Anglo-Irish literary intelligentsia of the past hundred years. (Readers interested in the relationship between Wilde and his fellow Irishmen may want another recent book by Ellmann, *Four Dubliners: Oscar Wilde, William Butler Yeats, James Joyce, Samuel Beckett*, Braziller, $12.95.)

Ellmann's account of Wilde's extraordinary career can be read at various levels. On the one hand, it is attractively written and crammed with the delightful anecdotes we always associate with Wilde. For example, the description of his lecture tour of America, with Wilde matching some tough miners drink for drink in Leadville, Colorado, is a tour de force of biographical narrative. At the same time Ellmann offers a subtle reinterpretation of the inner man, who accepted Walter Pater's view that habits are the enemy of life and therefore embraced all the contradictions of his own nature.

Though many of the familiar stories and sayings attributed to Wilde are apocryphal, Ellmann demonstrates that such fictions may reveal more than dreary facts can, and he is able to quote Wilde himself in support of this theory. As Wilde observed, "What is true in a man's life is not what he does, but the legend which grows up around him. . . . You must never destroy legends. Through them we are given an inkling of the true physiognomy of a man."

What Ellmann has achieved in this book is a life of Oscar Wilde conceived on an ambitious scale, written with clarity and humor (rare characteristics among academics nowadays), and informed by profound scholarship.

William S. Peterson
Professor of English,
University of Maryland

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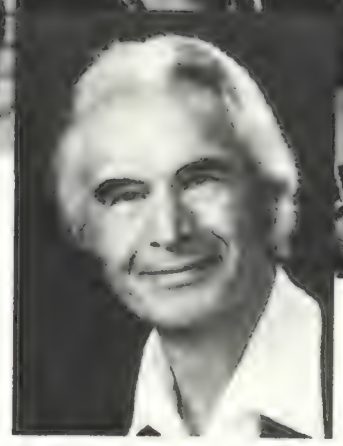

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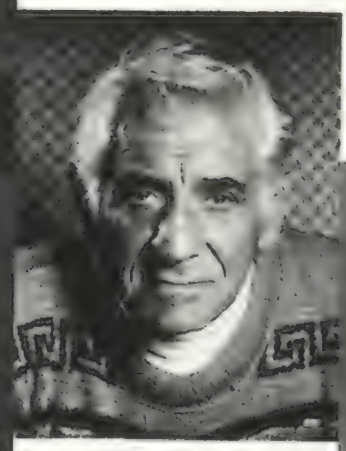

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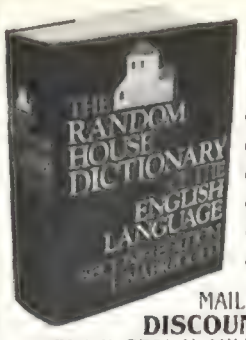

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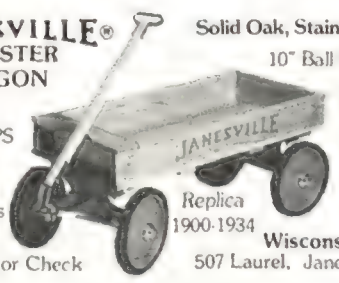

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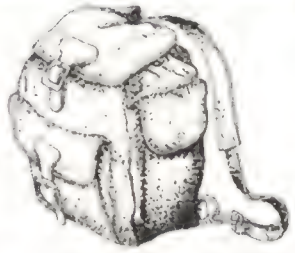

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Additional reading

Horizons (p. 10)
Public Opinion Quarterly, Journal of the American Association for Public Opinion Research, University of Chicago Press, Winter 1987

Origins (p. 36)
The History of Horse Racing by Roger Longrigg, Stein and Day (New York), 1972
A History of Horsemanship by Charles Chenevix Trench, Doubleday, 1970

Gemini 10 (p. 42)
On the Shoulders of Titans: A History of Project Gemini by Barton C. Hacker and James M. Grimwood, NASA (Washington, D.C.), 1977
Carrying the Fire: An Astronaut's Journeys by Michael Collins, Farrar, Straus, 1974
Gemini Summary Conference: February 1-2, 1967, NASA Manned Spacecraft Center (Houston, Texas), 1967

Paul Gauguin (p. 58)
The Art of Paul Gauguin (exhibition catalog), edited by Frances P. Smyth and Mary Yagush, National Gallery of Art, 1988
Gauguin: A Retrospective, edited by Marla Prather and Charles F. Stuckey, Hugh Lauter Levin Associates (New York), 1987
Gauguin: Life, Art, Inspiration by Yann le Pichon, Abrams, 1987
Gauguin by Belinda Thomson, Thames & Hudson (London), 1987

Diamond (p. 72)
The Diamond Dictionary by Robert A. P. Gaal, Gemological Institute of America (New York), 1977
Diamonds . . . Famous, Notable and Unique by Lawrence L. Copeland, Gemological Institute of America, 1974
The Book of Diamonds by Joan Younger Dickinson, Crown, 1965

Tumbleweed (p. 86)
"Russian Thistle—The Weed That Won The West" by James A. Young and Raymond A. Evans, *Weeds Today*, Vol. 16, No. 1, 1985
The Tumbleweed Gourmet: Cooking with Wild Southwestern Plants by Carolyn J. Niethammer, University of Arizona Press, 1987

Arlington National Cemetery (p. 104)
Old Arlington: The Story of the Lee Mansion National Memorial by Murray H. Nelligan, National Park Service, U.S. Department of Interior, 1953
In Honored Glory by Philip Bigler, Vandamere Press (Arlington, Virginia), 1986
Arlington National Cemetery: Shrine to America's Heroes by James Edward Peters, Woodbine House (Kensington, Maryland), 1986

'Building doctors' (p. 116)
Construction Disasters: Design Failures, Causes, and Prevention by Steven S. Ross, McGraw-Hill, 1984
Bridges and Men by Joseph Gies, Doubleday, 1963
"Why All Those Buildings Are Collapsing" by Walter McQuade, *Fortune*, November 19, 1979

Andrew Jackson Grayson (p. 146)
Birds of the Pacific Slope: A Biography of the Artist & Naturalist 1818-1869 by Lois Chambers Stone, Arion Press (San Francisco), 1986
"Andrew Jackson Grayson" by Lois C. Stone, *American West*, Summer 1965
"A.J. Grayson and His 'Birds of the Pacific Slope'" by Lois Chambers Stone, *A. B. Bookman's Weekly*, June 1987

Skin (p. 159)
"Epidermis: A Site of Drug Metabolism" by David Bickers, *Processes in Cutaneous Epidermal Differentiation*, Praeger Scientific (New York), 1987
"The Immunologic Function of Skin" by Richard Edelson and Joseph Fink, *Scientific American*, June 1985
Handbook of The Biology of Aging, edited by Caleb Finch and Edward Schneider, Van Nostrand Reinhold, 1985

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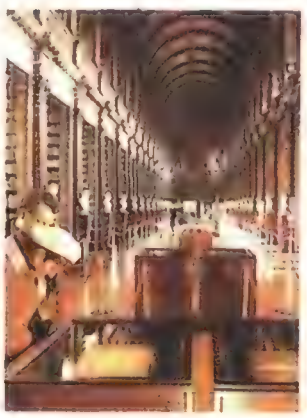

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Smithsonian highlights

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Extended summer hours

Five Smithsonian museums and the International Center on the Mall will have extended summer hours from Memorial Day weekend through Labor Day weekend (May 28-September 5). The museums of African Art, Air and Space, American History and Natural History, and the Sackler Gallery and the International Center will be open each day from 10 A.M. until 9 P.M. The Enid A. Haupt Garden will be open daily from 7 A.M. to 9:15 P.M.

The National Zoological Park will have its own summer schedule. From May 1 through September 15, the Zoo grounds will be open from 8 A.M. to 8 P.M.; its buildings, from 9 A.M. to 6 P.M.

Special May exhibits and events

National Portrait Gallery
Masterpieces from Gripsholm Castle: The Swedish National Portrait Collection (through July 10) Paintings and sculpture dating from early 1400s to the present. See *Highlights continued* (p. 194).
The Artist's Mother: Portraits and Homages (through June 5) Works in varied media by influential 20th-century artists.

Luohan Seated on a Rock by Feng Xilu is in the Sackler *Scholar's Studio* exhibit.

Arthur M. Sackler Gallery
The Chinese Scholar's Studio: Artistic Life in the Late Ming Period (May 1-June 26) Some 130 objects from the Shanghai Museum present the world of China's 17th-century scholar-artists (above).

Hirshhorn Museum & Sculpture Garden
Different Drummers (May 12-August 14) The special contributions of nine idiosyncratic post-World War II American artists.

Cooper-Hewitt Museum (New York)
The Outdoor Chair (May 24-September 18) Enjoy museum's garden from one of more than 40 original chairs styled by San Francisco artists, architects, designers.
The Art that is Life: The Arts and Crafts Movement in America, 1875-1920 (through June 26) The impact of the design reform movement is explored.

National Museum of American Art
Wanderlust (through June 19) Diversity of life and landscape in foreign lands as seen by American photographers in 64 color and black-and-white prints.
City Life: Photographs by Bruce Davidson (through June 19).

Renwick Gallery
Clay Revisions: Plate, Cup, Vase (through September 5) Three traditional ceramic shapes as they have been transformed into nonfunctional artworks by 26 artists.

National Museum of American History
A Material World New permanent exhibit explores the changing composition of American artifacts from natural materials to manufactured materials.

National Air and Space Museum
Charles Lindbergh Memorial Lecture (May 19, 8 P.M.) John W. Fozard, aeronautical engineer and designer, speaks on vertical-takeoff-and-landing aircraft.
Horizons: Paintings and Drawings by Robert Taylor (through April 28, 1989) British aviation artist captures the role of Britain in the air war of World War II.

National Museum of African Art
Royal Benin Art in the Collection of the National Museum of African Art (runs indefinitely) Traditional court art.

National Museum of Natural History
King Herod's Dream: Caesarea on the Sea (through June 19) More than 200 objects trace the archaeological and historical significance of Israel's renowned city from 22 B.C. to A.D. 1296.

Lecture and Seminar Program

Smithsonian Research Expeditions, a stimulating new program, will begin in August. Associates can work and explore with Smithsonian scientists in field settings, laboratories and archives to collect, organize and interpret data. Their efforts will directly contribute to Smithsonian publications and exhibitions.

The first expeditions will include: excavation of an Early Man campsite in Colorado (August 1-14 or August 19-September 1); Idaho agriculture and rural lifeways (August 15-26); dynamics of an active volcano in Costa Rica (September 12-22); and Air and Space archival treasures at the National Air and Space Museum (July 31-August 22).

For more information on Smithsonian Research Expeditions, write to the Lecture and Seminar Program, 1100 Jefferson Drive, S.W., Room 3045, Washington, D.C. or call (202) 357-1350.

Smithsonian on the air

Radio Smithsonian: Features on this weekly half-hour series include an interview with poet Allen Ginsberg, a discussion of aeronautical developments anticipated in the 21st century, and highlights of a concert by the world-renowned Kronos Quartet.
Here at the Smithsonian: Three-minute TV features present the sights, sounds

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Resident Associate Program

To become a Resident Associate, or for fee and ticket information, call 357-3030. Here are some May events:

Lebanon—Look Ahead (May 12; 8 P.M.) Ambassador of Lebanon Abdallah R. Bouhabib discusses his country's future.

Smithsonian Chamber Orchestra (May 14; 8 P.M.) Beethoven as he was heard in his own era.

An Evening With Isaac Asimov (May 17; 8 P.M.) Readings with discussion by the grand master of science fiction.

Ballads and Bullets . . . Ballads and Ballots (May 26; 7 P.M.) Chronicler of our national life, Oscar Brand sings about the past.

Exhibition catalogs

Catalogs available at this time include:

Clay Revision: Plate, Cup, Vase (paper, $15)

Air Combat Paintings of Robert Taylor (cloth, $50)

King Herod's Dream: Caesarea on the Sea (paper, $19.95; cloth, $29.95)

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Smithsonian Institution Traveling Exhibition Service

SITES organizes and circulates exhibitions to cities throughout the United States and abroad. To sponsor a show in your community, write SITES, Smithsonian, Washington, D.C. 20560. Here are some May exhibits:

Anchorage, Alaska (May 28-August 21) *Magnificent Voyagers: The U.S. Exploring Expedition of 1838-1842,* Anchorage History and Fine Arts Museum.

District of Columbia (May 21-January 1, 1989) *Tropical Rainforests: A Disappearing Treasure,* International Gallery, S. Dillon Ripley Center, on the Mall.

Midland, Texas (May 7-June 12) *John Held's America: Flappers, the Jazz Age, and Beyond,* Museum of the Southwest.

New Bedford, Massachusetts (May 21-June 19) *Victorian Gardens: A Horticultural Extravaganza,* Rotch-Jones Duff House and Garden Museum.

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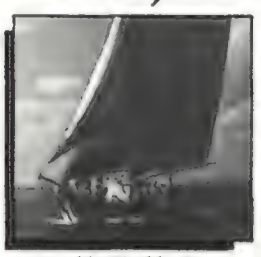
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Vail, Colorado, September 6-10
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Aircraft Restoration
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All seminars include opening and closing receptions. Accommodations are optional.

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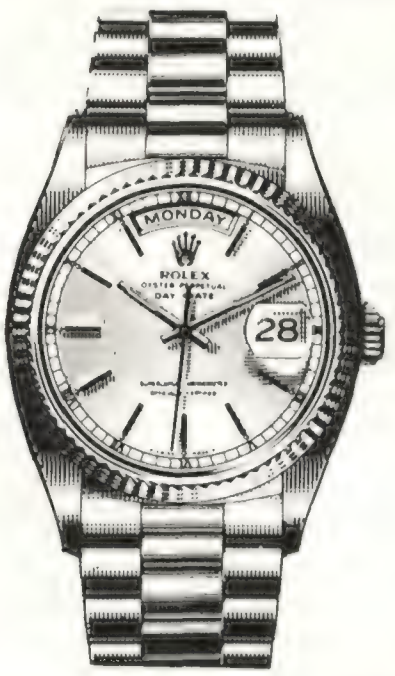

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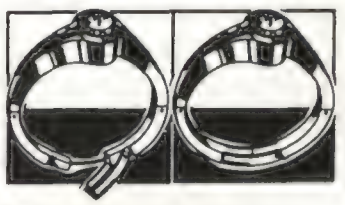

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Royal portraits come for a visit

Treasures from the Swedish National Portrait Gallery at Gripsholm Castle are now on view at the Smithsonian

The Swedes have arrived—again. But this time they're royalty and just visiting.

In 1638, travelers from Queen Kristina's Sweden established the small colony of New Sweden in what is now Delaware. To celebrate the 350th anniversary of the settlement, the U.S. Congress and President Ronald Reagan proclaimed 1988 the Year of New Sweden, and King Carl XVI Gustaf and Queen Silvia made a state visit. The royal couple also sent collections of treasures to tour the United States. One is "Masterpieces from Gripsholm Castle: The Swedish National Portrait Collection," at the Smithsonian's National Portrait Gallery through July 10.

Construction of Gripsholm Castle began in 1537. It was to be a fortress to protect the royal family in times of revolution, and where better than this fortress to protect the royal art collection? On this page is a sample of the visiting Gripsholm portraits.

Karl X Gustav (top left), who succeeded Queen Kristina, had been supreme commander of the Swedish forces in Germany and chose to have himself portrayed as a warrior. Gustav III (top right) followed his royal predecessors by having his own portrait hung among the pictures of his contemporary ruling sovereigns of Europe. A glimpse of the famous silver throne, still the throne of Sweden, can be seen to his right.

It is speculated that the Sack family (center) had gathered on some occasion to perform a little play or improvisation and decided that it would be amusing to have a souvenir of the occasion.

Since that first settlement in Delaware 350 years ago, Swedes have never stopped coming to our shores to settle. Now, with the loan of Gripsholm's collection, the descendants of those immigrants—as well as the rest of us—can feast on the riches of the old country.

Sally Scott Maran

King Karl X Gustav was rendered by French artist Sébastien Bourdon c. 1654.

Portrait of Gustav III in coronation robes, 1777, was set in a theatrical space.

The Sack Family was portrayed by Martin Meytens the Younger in 1731. The elegant style reflects Continental training of artist.

Studio of Jakob Henrik Elbfas painted Queen Kristina as young girl, 1634.

Museum official Gustaf Upmark was depicted by Carl Larsson in 1894.

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By Barbara Holland

Now is the time for bathrobes, the cloth of sloth

I do my best thinking in a bathrobe. I'm ashamed of it, naturally, and if anyone catches me at it I fake a sneeze; when you're sick you can wear a bathrobe. Otherwise you're supposed to be dressed for action.

America has never been a nation of bathrobe wearers. Paul Revere, Annie Oakley and General Custer all slept with their boots on. We're a frontier people and proud of it. Even now we feel we ought to be clothed to fight off Comanches at all times, and if the mailman catches us bathrobed we mumble and blush.

It has nothing to do with modesty, since a bathrobe covers us generously. It's the shame of being thought inactive. Bathrobes, the cloth of sloth.

Everyone says we live in an age of increasing leisure, defined in the dictionary as the "state of having time which one can spend as one pleases." But we shouldn't please to sit around in a bathrobe. We should go skiing. We wouldn't apologize to the meter reader if he caught us in our ski pants, but wearing a bathrobe isn't a proper use of free time. To be decent, American leisure must be vigorous. If we were out jogging we'd be considered a useful member of society, but in a bathrobe we're a leech, a slug, a parasite.

Bathrobes restrict activity. You can't mow the lawn or do aerobics in them—that's their charm and their shame. In the full-length female model you can't even walk up the stairs without tripping, though most male bathrobes stop at the knee, no one knows why. Perhaps men are thought to have more need of their legs: if a fire starts, they can carry their swaddled wives to safety.

By limiting movement, the bathrobe releases the mind, like going into the lotus position but less painful. Enfolded in fabric, unable to bustle about, we can still read the Sunday paper, listen to music, sort old photographs or paint watercolors, absentmindedly wiping the brush on our laps. We probably won't muse over the budget deficit because you need proper clothes on to pay serious attention to current events. That's why the Sunday paper should be read in a bathrobe; it softens the hard edge of happenings. We can contemplate the arms race and a recipe for asparagus soufflé with equal detachment. Bathrobes encourage the long view and a sense of the durability of a civilization more likely to include soufflés than the arms race.

The bathrobe keeps us home, excused from dealing with the world. Feet on the coffee table, we are draft exempt from the battles of business and daily life. "I'm not dressed," we reply when people suggest that we drive them to the airport or put up the storm windows. Outside, time grinds through its endless events, large and small, but we can't be expected to take part: we aren't dressed.

The bathrobe keeps us gentle. It's possible to sulk in a bathrobe, but not to rage. A furious person in a bathrobe would be a joke, commanding neither respect nor fear, and when we feel a fit of temper coming on we instinctively go put on street clothes in which to have it. Habitually bad-tempered people never wear bathrobes—in order to stay prepared. You can make love in a bathrobe, but not war. Statesmen should wear bathrobes at all times.

Statesmen are probably afraid of them, though. A lot of people are. They won't admit it, but they think the bathrobe mindset, once yielded to, might weaken them forever. The soft folds, the easy sleeve, would soak through to the muscle and decay it. The taut bow of their determination would be quite unstrung. They would—perish the thought—relax, and this would be followed immediately by chronic unemployment and beer for breakfast.

You can tell bathrobe-phobics because they never oversleep, and always dress and tie their shoes before they drink their coffee. They often say "I like to keep busy." They say this whenever they see someone in a bathrobe.

Accomplishment means scurrying around with your shoes on. The prophets tell us about a future in which the modern executive will stay home and do it all by computer hookup, but I don't believe it—the American people would never stand for it. I mean, what's to stop him from getting through an entire day's work in his *bathrobe*? What would Daniel Boone say?

A friend of mine has cleverly replaced her bathrobe with a sweat suit. She's still lounging around over coffee at noon, but she doesn't look it; she looks as if she got up at 5 to jog. People in real clothes see her and feel guilty, instead of asking scornfully if she's sick. Still, a sweat suit just isn't the same. It doesn't impart the same peaceable viewpoint. Sweat suits are involved, bathrobes are detached.

Besides, you can go outside in a sweat suit, so it doesn't get you out of doing things. True, I've driven people to trains in my bathrobe, but it isn't decent and I always hoped the robe would pass for a coat. I tried to put a coat expression on my face instead of a bathrobe expression. The brisk, dressed expression.

Surely, surely, it's time America packed in all this booted-and-spurred business, barging out to shoot buffalo or clean the gutters. Must we always stay dressed to chase cattle rustlers? Can't we put on our bathrobes now?

Bathrobe wearers of the nation, stand tall. Open the door freely and proudly, even to your in-laws, and let them see what you're wearing. The frontier is closed. It is time now for philosophy, for contemplation, for bathrobes.

Perhaps even for an afternoon nap.

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